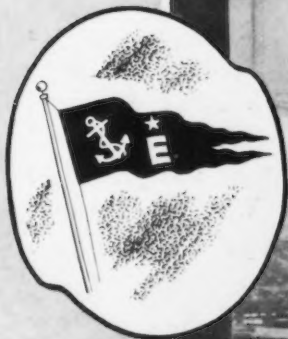
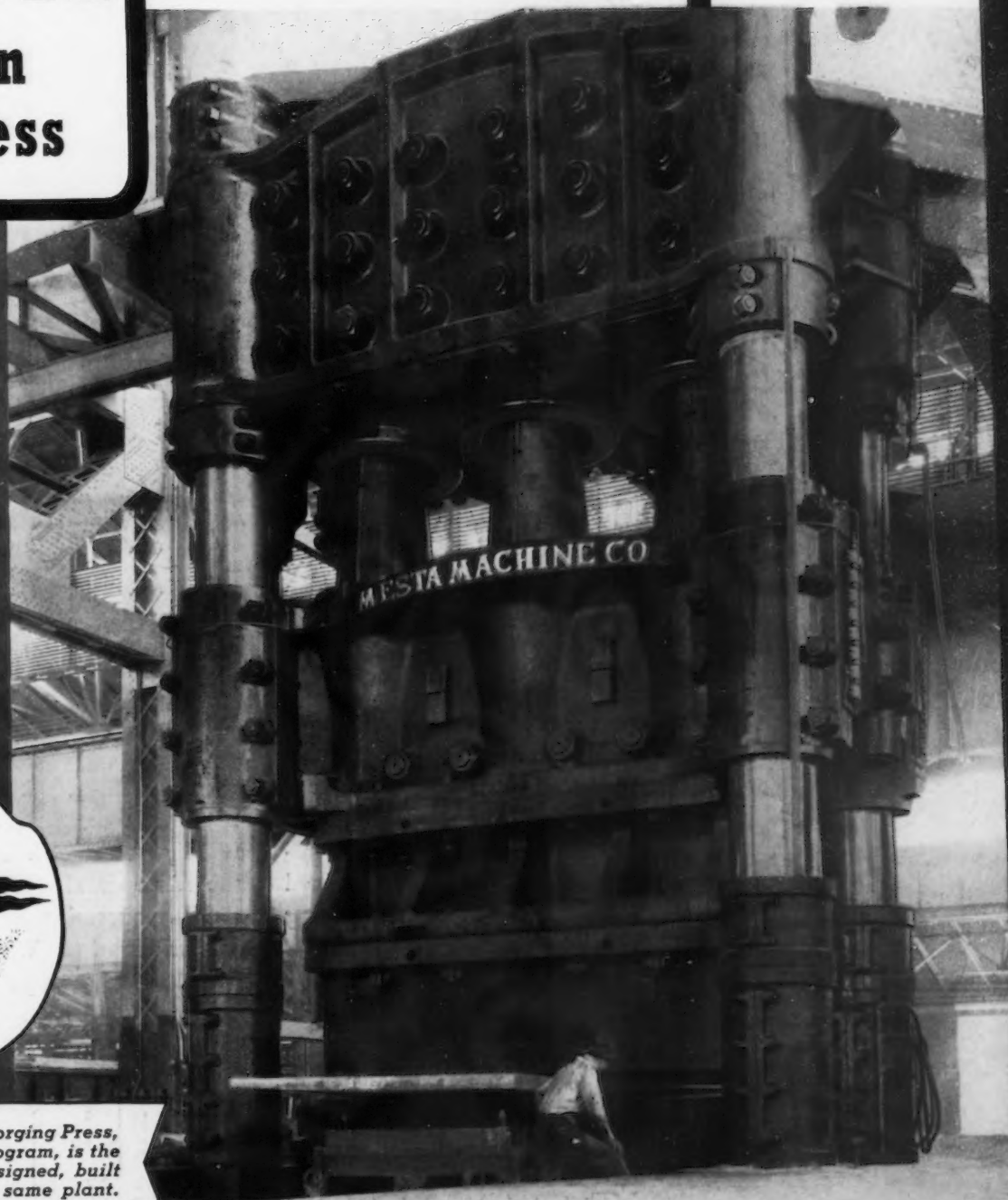


OCTOBER 29, 1943

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Member, Audit Bureau of Circulations
Member, Associated Business Papers
Indexed in the Industrial Arts Index. Published every Thursday. Subscription Price North America, South America and U. S. Possessions, \$8; Foreign, \$15 a year. Single copy, 35 cents.
Cable Address "Ironage N. Y."

Owned and Published by
CHILTON COMPANY
(Incorporated)

Executive Offices, Editorial and Advertising Offices
Chestnut and 56th Sts., 100 East 42nd St.
Philadelphia, Pa., New York, N. Y.
U.S.A., U.S.A.

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THE problem is simple to state. The nation's supply of essential materials must be made to go farther—particularly the vital alloy steels. More must be done with less.

Nosing out the scrap—the idle or dormant metal—is highly necessary, but it's only half the answer. The other half lies in using *new* alloy steels more efficiently—checking machine set-ups and plant procedures to reduce rejects, spoilage and undue scrap—using lower alloys wherever possible—plugging every loophole of waste.

Scrap the old steel, conserve the new; that's the only way the nation can secure a greater yield of war

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THE IRON AGE

• •
OCTOBER 29, 1942

• •
ESTABLISHED 1855



The Empty Chair

THERE are some four million empty chairs at the tables of American homes today; chairs which not long ago were occupied by our beloved sons and brothers. And already, though the second front is still to come and we have hardly begun to fight offensively, many of these chairs will never again be occupied.

There is a real democracy in these empty chairs. They are to be found in the homes of the rich and the poor; the employer and the laborer. But by sheer arithmetical weight of numbers, there will be far more of these permanently empty chairs in the homes of labor than in all other categories. For today we have over 54 million workers in our labor forces. And that means 64 per cent of all the men and women between the ages of 15 and 59.

Each one of us, no matter what his station in life may be, is responsible for doing everything in his power to help win this war. It is a responsibility not merely equal to that of the soldiers and sailors who are going abroad to fight for their country but one that is even greater. It is greater because they are risking their lives and in many instances will lose them. It is greater because they are subject to established discipline while we must depend on self-discipline.

Self-discipline is not an easy thing to exercise in a democracy that has been based upon individual freedom. Yet we must attain it here at home in our daily work if we hope to match the totalitarian efficiency of the Axis powers.

We have not yet achieved that self-discipline here. If we had, we would not hear of 20 per cent absenteeism in some of our war production plants.

Can you imagine such things as this happening in the war production plants of the Axis powers? Can you imagine a German or a Japanese mechanic or machine operator taking a day off from work each week because he happens to feel a bit under the weather or because big wages are burning holes in his pockets?

This is not a problem that management can solve. It is a personal problem for labor. Or perhaps, in some instances, for labor unions.

The American public, of which labor is such a large part, will cheerfully do without meat or coffee or gasoline. It will buy bonds to the limit and undertake a tremendous tax burden. It will even resign itself to the drafting of our 18-year olds, most of whom seem like babies to their fathers and mothers.

But the American people have the right to expect that every man will do his duty. And at home that duty is to put in every possible working moment. It's not too much to ask in view of our established working week.

Remember, friends, an empty place at the bench or machine may mean an empty chair after this war in somebody's home, perhaps in yours.

J. W. Van Dusen



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Quarrying limestone seems far remote from steelmaking. Actually it is one of Inland's vital

war jobs, for the Inland quarry furnishes pure limestone so essential to the making of fine steel. This limestone quarry is only one of many Inland-controlled sources of raw materials. Inland also operates its own ore mines in the northern ranges, and coal mines in Kentucky.

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What is Briquetting Current Practice?

By W. A. PHAIR
Western Editor, THE IRON AGE



Unloading cast iron briquettes at the Pontiac Detroit foundry.

... Presented herewith is a survey of briquetting practice of 12 plants, giving details of melting losses, die size, briquette weight, and the amount of briquettes which can be used to a charge. This information was collected to find answers to the questions put to THE IRON AGE by prospective users of briquetting equipment.

THE war is one mighty battle of lathes, milling machines and drill presses. This is best exemplified by the steel and cast iron turnings and borings that are pouring, in ever increasing volume, into scrap dealers' yards.

The economic use of these materials, aside from the small quantity consumed in chemical plants, has always presented a problem. Today, in face of a shortage of scrap metal, the importance of obtaining the full re-use value of borings and turnings is most essential.

Difficulty in handling these materials because of their bulk and looseness, together with their erratic behavior in open hearth and cupola, have been the chief stumbling blocks to be overcome in de-

veloping their wider acceptance as a scrap metal.

Various means of packaging to simplify handling and melting have been devised. Practically all these methods have been discarded except that of briquetting. This latter treatment has been acknowledged as the most economical means of handling the material, in many cases paying for itself by making available a source of scrap not otherwise available.

At one time the war agencies were seriously considering the establishment of regional briquetting plants to cope with the flow of turnings and borings expected. In the meantime, numerous individual plants have installed units since the emergency was declared in 1940, in-

cluding plants abroad, and the backlog of orders for such equipment is tremendous.

THE IRON AGE has received numerous inquiries concerning briquetting practice which cannot be answered on the basis of existing literature. In an attempt to fill these voids, it was decided to enlist the assistance of a number of plants with considerable experience in operating briquetting machines to obtain certain information. The results of this survey, in which 12 plants participated, is presented herewith.

As this is the first survey of its nature ever conducted, the data collected are not all on as comparable a basis as would be desired. Too, it is indicated that in many briquetting plants there is a lack of detailed operating data on the equipment.

THE IRON AGE thanks the plants supplying information and hopes that the data will be of value to plants contemplating the installation of briquetting equipment.

Of the 12 plants participating in the survey, six briquetted both cast iron and steel, while six handled cast iron only. The die sizes, bri-

quette size, weight and production are given in Table I. Briquetting machines are manufactured in various capacities. The output data given in Table I do not necessarily represent the maximum capacity of each unit. Various situations, such as the amount of material available, may exist in individual plants that do not permit utilizing the full capacity of a press. On the other hand, it is possible to force a press to produce in excess of its rated capacity. The figures given in Table I indicate only what a given plant is actually doing. These figures should not be construed as indicating capacity ratings in themselves.

Note: The identification, as plant A, etc., is used only to simplify tabulation and this marking is not comparable in all tables. Thus plant A in Table I is not necessarily Plant A in other tables.

The plants participating in this survey were asked if they had experimented with other die sizes, and if so why had they standardized on the size being used. It appears in a majority of cases that the recommendations of the machine maker have given the most satisfactory results. In one instance it was reported that experimenting resulted in some costly lessons as ram freezing, chipping of the die, etc. In several cases the same die is used on both cast iron and steel, although the briquette size is not always the same due to the different compressing characteristics of the two metals.

One plant reported starting with a 2¾-in. briquette, but going later to 3 in. to increase production. This plant is using a small machine, but with a 3-in. die is able to handle

4 tons of steel or 8 tons of iron per 8-hr. run.

There was general agreement that the melting loss encountered with briquettes is around 5 per cent, the exact average being 5.3 per cent. The melting losses are given in Table II. Here again a lack of standardization in reporting makes it difficult to compare these losses. The circumstances surrounding the one loss of 10 per cent are somewhat unusual and are not those met in ordinary practice. Too, experience is also a factor in the melting losses. Plants that have been using briquettes for many years and who have made an intensive study of their action in the cupola are usually able to bring the loss below 5 per cent, often in the neighborhood of 3 or 4 per cent.

Another interesting phase of the survey was the wide variance in the amount of briquettes used in each charge. While the types of casting being produced are the determining factor in this ratio, it was noticeable that in several cases, plants making practically the same type of iron differed widely in the quantity of briquettes used. It is quite possible the factor of supply, which was not accounted for in the survey, accounted for the difference. Table III shows the percentage of briquettes used per charge.

The question of what is the maximum percentage of briquettes which can be used with a charge is again dependent largely upon the type of casting poured. Heats consisting of 100 per cent briquettes have been cast experimentally, but, according to the survey, it appears that most operators feel that 50 per cent is probably the economic maxi-

mum under today's price conditions.

In connection with this problem it is interesting to note that one machine tool casting maker commented that 50 to 60 per cent cast iron briquettes could be used to make high grade machine tool castings and that as high as 50 per cent steel briquettes may be used, but the carbon will be low.

Some of the typical percentages used are as follows:

For both high test and soft iron, 30 per cent steel and 30 per cent cast iron briquettes. A plant running cylinder iron reported having used as high as 25 per cent cast iron briquettes. A maker of alloyed brake drum iron, which is duplexed in an electric furnace, uses the following charge: Cast iron briquettes 50 per cent; pig iron 25 per cent; returns 10 per cent; alloys 1 per cent.

Another producer of piston and cylinder iron regularly uses 10 to 20 per cent cast iron and 10 per cent steel briquettes. A plant running 40,000 tensile iron states that it regularly uses 10 per cent cast iron and 8 per cent steel briquettes, although as high as 35 per cent briquettes have been used.

A practical description of handling, mixes, effect of oil and other cupola problems is contained in the article "Cupola Practice with Briquettes," published in THE IRON AGE, Aug. 27, 1942, p. 39.

On the question of segregation of borings and turnings by analysis, it appears that much work is yet to be done, although several plants are already separating the nickel containing material from plain iron and steel. In another instance, material is separated into two silicon classes: 1.90 per cent and over and 1.90 per cent and under. Of course, in some plants, running only one type of iron or steel, segregation is not necessary.

Another question in the survey asked whether or not it was necessary to make important changes in melting or charging practice to accommodate briquettes. In all cases it was asserted that only minor changes were necessary. Typical comments on this question were:

"Where high percentages of steel briquettes are used, provisions should be made to increase graphitic carbon."

"Use a higher coke bed to get better results. More desulphurizing necessary. Used soda ash for this purpose."

TABLE I
Briquetting Practice in Various Plants

Plant	Output, Tons Per 8 Hr. Per Machine		Briquette Size*		Weight, Lb.		Density, per cent	
	Cast Iron	Steel	Cast Iron	Steel	Cast Iron	Steel	Cast Iron	Steel
A	10 to 12**	..	4¼x3½	4¼x2½	9.8	6.8	..	..
B	16**	..	4¼x2½	4¼x3½	6	6	80	65
C	8	4	3 (dia.)	3 (dia.)	2¼	17/8	..	..
D	20	..	4½x3	..	9 lb. 1 oz.	..	..	..
E	22	..	4¾x4	..	11	..	78	..
F	20 to 25	10 to 14	..	..	8 to 9	4 to 5	..	..
G	35**	..	4x3½	7x3½	8.5	22	..	..
H	30	20	5 (dia.)	5 (dia.)	14 to 15	9 to 10	..	..
I	20	..	4 (dia.)	..	10	..	80	..
J	18	15	3x3	4x1½	4	3	85	75
K	7	..	2¾x2½	..	3	..	80 to 90	..
L	20	..	4¼ (dia.)	..	10.5	..	78	..

* First dimension is diameter.
** Cast iron and steel.

TABLE II
Melting Loss Using Briquettes

Plant	Per Cent Loss
A	5 to 6
B	4 to 6
C	5
D	3 to 5
E	5
F	4
G	5
H	*
I	3
J	10
K	7
L	*
Average	5.3

* Not reported.

"Lower carbon pickup with cast iron borings, which must be adjusted for."

One plant warned that precaution must be taken to bring down high sulphur content. This was being accomplished, it was stated, by use of a fore hearth and 4 lb. of soda ash, or Purite, to a ton of metal. This plant uses cast iron briquettes only, some of which contain cutting compound. This compound is largely removed by draining.

In answer to the question "did briquetting reduce your spout metal cost?", all plants in the survey reported yes. While many were unable to supply estimates as to the extent of the reduction, probably due to the fact that this is dependent upon the market price of the borings, one plant estimated the savings at 6 to 12 per cent, another at 8 per cent, and a third at 2 per cent.

Probably the most interesting phase of the survey was the wide range of answers as to what were the advantages of using briquettes as compared with ordinary scrap. The following are typical comments:

Lower cost of scrap.

When using home produced borings, analysis of melt can be more closely controlled.

Charging practice simplified due to uniform size of briquettes.

Simplification of storage problem.

Assured scrap supply.

Uniformity of size.

Assurance of supplies under present conditions.

Lower metal cost at spout.

Better micro-structure.

More compact metal charges.

Easier to handle.

A general reticence was shown toward divulging cost figures, de-

spite the assurance that all such data would be held strictly confidential and not used for any purpose other than this survey. Such cost data as were reported were not on a basis to permit a direct comparison. For example, one plant had constructed a building and had installed an extensive conveyor arrangement to handle the briquettes. The cost of this building and conveyor line, and its amortization was charged against the briquette costs, while in another plant with the same situation, construction costs were disregarded. Another point of divergence was in the period of amortization.

The cost was also widely affected by the degree to which the capacity of the machine was utilized, thus a machine working 24 hr. a day has a much lower cost per ton than a machine working only an 8-hr. shift, yet the machine working only 8 hr. may be more than paying for itself. It is hoped at a later date to devise a means of establishing these costs on a common basis.

One briquetting machine operator, who is noted for his work in this line, warned that the layout design of a briquetting installation is of utmost importance in determining final cost. This is because

TABLE III
Per Cent Briquettes Used in Each Charge

Plant	Cast Iron	Steel	Castings Made
A	50	20-40	Machine tool
B	15	varies	Miscellaneous
C	30	30	High test and soft iron
D	10 to 20		Cylinder iron
E	50		Alloy iron, duplex
F	10 to 20	10	In electric furnace; Piston and cylinder iron
G	10	8	40,000 lb. tensile iron
H	15	15	Soft iron
I	10		30,000 lb. tensile iron
J	20	10	General gray iron
K	4		Cast iron, pressure
L	20		Cylinder iron

labor is one of the largest items in the cost of briquetting and the layout has an important bearing on this item.

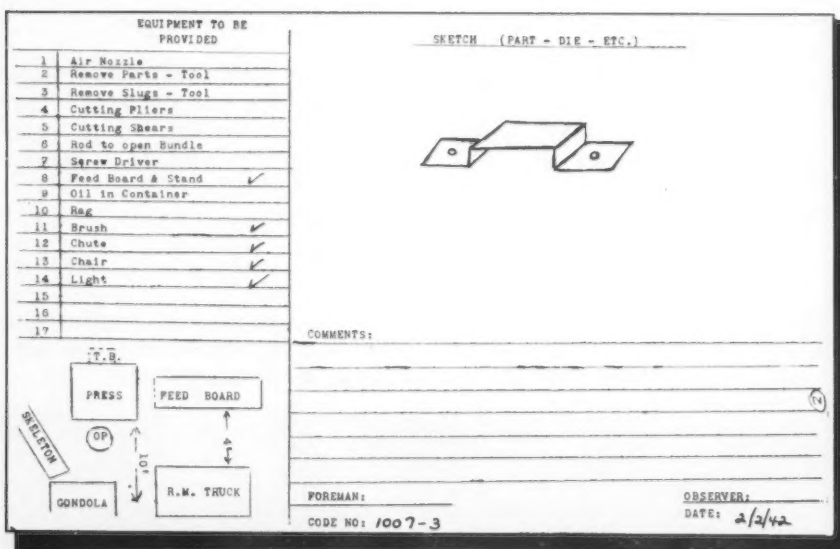
Another plant remarked that at one time they had more chips than briquetting capacity, so they added another hydraulic pump to the machine and increased its capacity 30 per cent.

STEEL turnings leaving the centrifuge which removes oil from the turnings at the Pontiac foundry in Detroit. After de-oiling, the turnings are fed into a crusher and then go to the briquetting machine.



[illegible]

FIG. 1—The face of the "standard time card" identifies the part, material and equipment; itemizes the operating method; and carries a table of elements for compiling operation time, the task, or the piece rate.



PROPERLY organized time study records are an important factor in the establishment and maintenance of uniformity in manufacturing processes. This in turn gives operating men a true picture of the advantages of using standard labor costs derived from wage incentives. These records also supply a quick source of information to assist in the preparation of accurate cost estimates.

Yet too often the methods engineer or cost estimator is faced with the complex task of basing his information on a selection of studies which merely bear a close

resemblance to the operations planned for the new part. They are often mere records of standards established for a single job only. Detailed descriptions and timing of material handling, methods, and surrounding conditions are usually incomplete or lacking.

It is obvious that a planned procedure of taking studies cannot assist methods men and cost estimators in compiling their figures more quickly and more accurately. The results will be more consistent, labor standards can be set up faster, and the time study dollar made to go further. Intel-

Planned

By H. C. GEPPINGER

General Wage Rate Department
General Electric Co.

ligent planning of this sort will produce a uniform breakdown on similar or identical jobs and provide records of all elements in the cycle. In addition, it details the layout and method of operation.

The advantages gained by this type of planning are well illustrated by reference to a typical problem and its time study methods. Fig. 1 represents the face of a "standard time card" used in this plant for computing labor standards for punch press operations on parts made from strip stock.

The scope of the card is limited by the following physical conditions:

Equipment: Floor type punch presses.

Materials: Strip stock—steel, brass, copper, aluminum, fiber or Textolite—not exceeding $\frac{1}{4}$ in. in thickness, with width of 16 in. or less and in lengths up to 13 ft.

Operations: All "first" operations on strip stock such as blank, pierce and blank, cut-off, pierce-form and cut-off, and similar combinations.

Dies: Through, compound, cut-off, follow, etc.

Feed: Hand feed, either continuous or interrupted.

Locating: By means of end stop, automatic stop, over guide or locating pins, or by sight.

Part disposal: Hand removal or blow-off.

Operations Record

The "operation" or "standard time" card takes the place of the time study sheet as a record of the operation and the method. The face of this card (Fig. 1) has three distinct features: Identification of part, material and equipment; an

Time Study Standards

itemized record of operation method; and a table of elements for compiling the standard operation time, the task, or the piece rate.

The back of the card (Fig. 2) shows four elements: A record of the tools and equipment required; a schematic floor layout; a sketch of the part to be produced, or of the die; and a column for comments and signature.

The establishment of standards by means of the card is made in three steps. The rate man will:

(1) Observe the actual operation, condition, and layout; record all information necessary for the proper description of the part, material, and equipment; check off the operating method and equipment to be provided; make comments on conditions of tools, equipment, and economy of operation; and draw a rough sketch.

(2) Relate this information to the table of standard time values shown on the "standard time report," and calculate the piece price, recording in the designated column each element that applies to the particular job.

(3) Present the standard time card to the foreman, discuss the job, and obtain approval.

Time standards or tasks will then be issued, and the card will be filed in the wage rate dept. The foreman will be provided with a copy of this card to assure uniformity of set up for subsequent production runs.

A practical example of determining the piece price on a bump, form, and cut-off operation is shown in Fig. 1. Physical conditions applying to the job have been checked off to the right, indicating that a cut off die is used, the part is being ejected by air and the press is being run intermittently (interrupted). This column also shows that the stock is pushed against an end stop; that the container holds approximately 3000 pieces; and that the end of the strip becomes scrap which must be put in the scrap box.

Other information needed for selecting the proper time elements

... Standardized time study procedure in a New England G. E. plant furnishes quick, accurate reference data for methods men and cost estimators.

o o o

is shown at the head of the card, such as:

Speed of press 130 r.p.m.
Work station No. 156-1
Stock size 0.062 x 5/16 in. x 8 ft. long
No. of strokes per strip 53
No. of parts per strip 53
Length of part for hand feeding ... 1 3/4 in.

Time Calculations

With this information the basic time values for elements A, B, C, etc., can be secured from the standard time report sheets on which all values have been listed.

Element A—Press Time: Data on the standard time report sheets give the time per stroke for various types of dies and arrangements. Reference to one of these sheets shows that press time, based on a rate of 130 strokes per min., with a cut off die, blow off, and interrupted feed, is 0.0157 min. This figure multiplied by the number of strokes per strip, 53, gives a total time of 0.8320 min. per strip.

Element B—Interrupted Hand Feed: The report sheets indicate a feeding time for interrupted feed with an end stop of 0.0003 min., provided feed is 3 in. or less. The actual feed in this case is 1 3/4 in., hence this value is posted on the card and multiplied by 53, the number of pieces per strip. This shows that the 8-ft. strip can be fed in 0.0159 min.

Element G—Move Tote Boxes: The notation on the card shows 3000 pieces per tote box, hence the time per strip will be:

$$\frac{0.60}{3000} \times 53 = 0.0106 \text{ min. per strip}$$

The figure 0.60 min. is the standard time for moving a tote box.

Element K—Place Stock in Die:

The time required to pick up a strip and place it in a die varies for different materials and sizes. The standard report gives a time of 0.0976 min. for steel strip up to 9-ft. long and 1-in. wide, so this figure is posted to the card.

Element L—Support Stock in Feeding: For cut off jobs within the size limits of the strip specified the standard time figure is given on one of the sheets as 0.1003 min.

Elements M and Q—Place Stock and Remove Scrap End: Again, these particular operations can be found in tabular form on the time report sheets and are merely posted to the card to complete the list of elements necessary to complete this group of operations on the part.

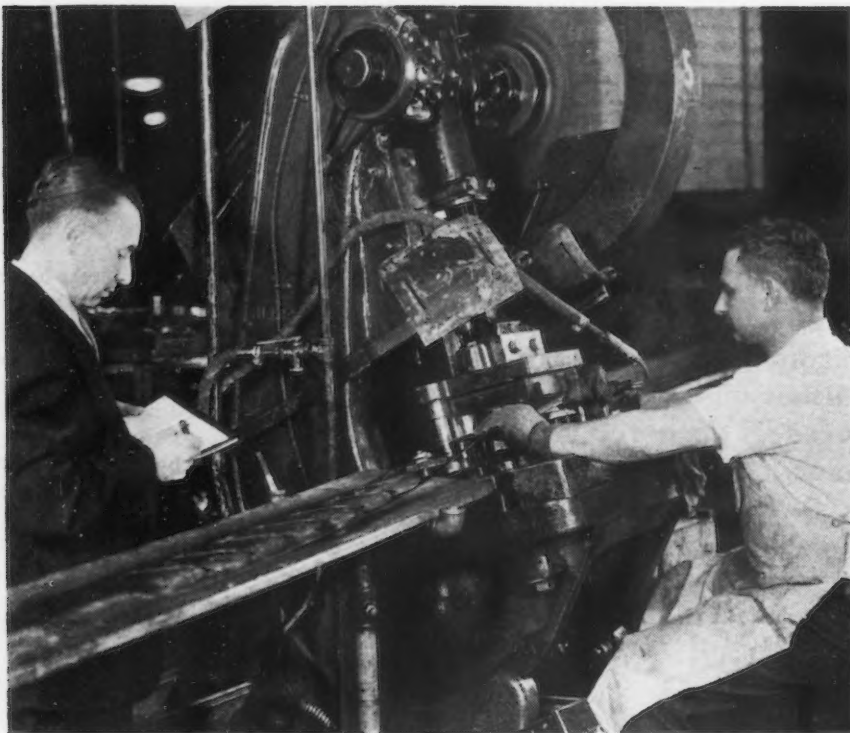
To the total of 1.1124 min. a general allowance of 15 per cent is added, and calculations of production and price are entered in the proper spaces.

This method of determining operation times has been used at this plant for some time and is applied to all new parts going into production. When conditions arise that have not been covered previously and cannot be changed to fit into the established standard pattern, they are analyzed and practical elements added. On jobs of special nature or on any job on which the task, established in this manner, is questioned, watch studies are taken to check the fairness of the standard.

Setting Time Values

The methods used for establishing the standard time tables and individual time values comprise: Time study by actual observation, motion analysis from observation, and motion analysis from films.

All studies made to establish the tables of standard times were planned thoroughly and broken down uniformly. Variations of like elements were carefully investigated and compared to establish the causes and their possible relation to the die, part, stock, or surrounding conditions. In all cases that did not give a conclu-



TIME study man uses a "standard time card" to check off all physical conditions on a typical pierce and blank job. The piece price can then be set without timing any part of the cycle.

sive answer, motion analysis was made from observations or from films. This method was also employed on very short elements that could not be recorded accurately by the watch and required further analysis and breakdown into constants and variables. On some of the tables not all values could be substantiated and it was therefore necessary to plot the points available on a graph and determine intermediate points by interpolation.

After all basic values had been determined, the task remained of arranging and combining related values for the purpose of simplicity of application. This has been done whenever practical without destroying the accuracy of the final time value. Element A, Press Time, represents a value of this type and therefore cannot be checked from the press speed.

Assuming, for instance, a press speed of 130 strokes per min., the time per stroke would be $1/130 = 0.0077$ min. All table values for this particular speed, however, show higher values, since they are combined with values representing other conditions that are in relation to press strokes.

While the analysis was in progress, unsatisfactory conditions and undesirable variations of methods were discussed with the

floor supervisors in order to improve and establish them on a more uniform basis.

Efforts were especially directed towards minor causes of variations from set up, die, and hand-

o o o

FOLDING skeleton to prepare it for the scrap box. This is Element M on the time card illustrated in Fig. 1, although the part is not that detailed on the card.



dling conditions, which, if reduced and limited, would permit establishment of practical time values. It was suggested that the men responsible for set-ups insure good operating conditions by:

(1.) Making a test run on new set-ups, checking stocks and stripper plate to insure free feeding; checking burrs on punched holes and accuracy of centering the punch. (Studies available on the same part indicated variations in time of feeding of as much as 100 per cent because of excessive burrs.)

(2.) Supporting the air nozzles for blow-offs rigidly and directing the air jet accurately against the work piece.

(3.) Placing of chute aprons to the rear of the die to prevent blow-off parts from being caught in recesses or on bolts or die clamps.

(4.) Checking of automatic (ram-operated) and finger stops, to see that the stops work freely, yet accurately.

(5.) Placing drop lights between the uprights of every machine to insure clear vision.

(6.) Instructing the operator in the proper use of oils and compounds for use on the stock as well as on punch and die.

(7.) Supplying the operator with effective hand tools for placing strip or removing parts and for removal of fasteners from raw materials used for processing.

(8.) Having raw materials, containers, tools, oil, feed board and stand, etc., on location before the operator is assigned to the job.

Advantages

The advantages of establishing tasks by the standard time method may be stated briefly:

(1) Tasks can be set in less than one-half the time formerly required by the time study method.

(2) Established tasks will show greater accuracy and consistency, since the values are not affected by the judgment of the time study man in rating performances.

(3) Fairness of tasks is assured since all values are based on a normal production level of performance in which normal operating delays have been considered and granted.

(4) The record of the method of operation as shown on the card will enable the set-up man to reproduce like set-ups for future production runs, and, in general, will keep supervision alert to maintain the established level of standardization of methods.

(5) Use of the standard time card results in more accurate estimating on new devices by relating the operation methods of the new parts to data actually applied on cards in the files of the wage rate department.

Investigation of Welding Problems Through Metallurgy

By L. L. WYMAN

Research Laboratory, General
Electric Co.

THE welding of two or more pieces of metal into a single unit presents problems far greater than those concerned with the production of a sound weld. Ever-increasing engineering demands on welded structures require performance beyond that indicated by apparent soundness.

The rapid advances in welding techniques which have taken place during recent years are considerably in advance of the application of engineering, chemistry, and metallurgy to the welding problems. While it is true that much effort has been expended in studying welding processes from these various standpoints, there is but small doubt that a far greater amount of fundamental work of a more scientific nature must be done in order to bring our knowledge of welding processes to a state which is comparable with our understanding of other fabricating methods.

In order to accomplish these ends, it becomes essential to make a comprehensive study and analysis of each new welding problem from the standpoint of the reactions that are taking place during and after the actual welding operation.

Radiographic technique has long been used to study and test welds from the standpoint of soundness. It may even be possible to establish standards by this method. This may be particularly true with the broader applications of radiographic equipment, which is reputed to be able to differentiate to the order of 2 per cent.

This form of weld study has been applied particularly to determine the quality of the welding operation itself, in the light of weld design and qualifications of operators. However, the more stringent en-

... The rapid advances in welding technique which have taken place in the last few years are creating a need for prompt advancement of engineering, chemistry and metallurgy as applied to welding problems. Presented here is a discussion of metallurgical investigation methods including the microscopic study of porosity, micro-cracks, non-metallic inclusions and similar characteristics of inclusions in the various parts of the weld itself, as they affect weldability.

gineering demands on welded structures are now forcing the situation to a point where, in some airplane applications for instance, the demands for soundness of weld approach perfection itself as a criterion.

When such situations must be faced, careful study of all the factors involved in the entire process may reveal that the demands are such that, with the best operators and technique obtainable, the variations from one heat to another of the same kind of steel from the same mill may be sufficient to cause rejections of the material itself.

Fusion types of welding combine the extremes of the metallurgical conditions of a metal or alloy into one unit which should meet the highest performance requirements. For instance, the parts to be united may have been either cold-worked or heat-treated. In either case the metal may be materially altered in structure and properties by the heat of the welding process. Nevertheless, these pieces are to be united by a casting—the weld itself—and the final product is often expected

to meet the requirements of the parent pieces.

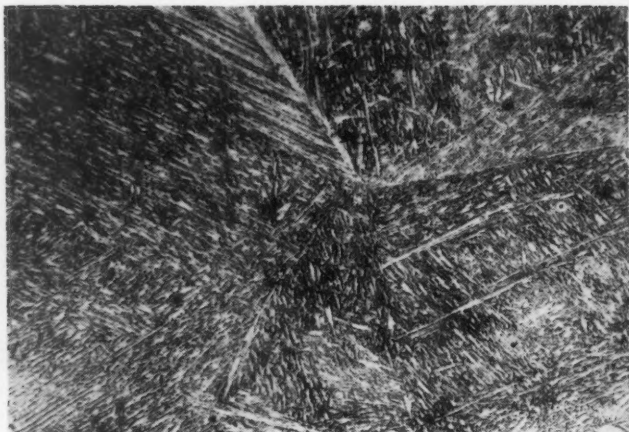
In many instances the filler rod used in the welding operation is of entirely different chemical composition than that of the parts to be joined. However, the properties of this rod "as welded" should closely approximate the over-all properties of the entire assembly. This not only holds true for those instances in which the mechanical properties are of first importance, but also where the chemical properties (corrosion) or high-temperature, heat-resisting characteristics are concerned.

The electrodes or filler rods themselves may be subject to the same erratic behavior as that referred to above in connection with the parts to be joined. As a consequence of this, the difficulties become compounded.

The highlights of a recent example of such variations may serve to illustrate the importance of base material weldability. In this particular application, a low alloy steel of the "tonnage" class, used quite widely in automotive applications, was to be utilized in a welded struc-



MICRO-CRACKS at the junction of the weld metal with the parent stock, resulting from regional hardening.



MICROPHOTOGRAPH of a plate weld made to permit study of the micro-structure for visual evidence of area hardening.

ture which was to be subjected to severe vibratory stresses in actual service. Quite obviously, the welded portions had to be perfect. Difficulty in welding occurred, however, although the most careful investigation of the welding operation revealed a nearly perfect technique.

The difficulty which was being experienced manifested itself by a certain wildness of the molten pool and then the erupting of this pool just before solidification, leaving deep pock marks. Examinations made on sections through these eruptions disclosed that most of them originated in the plate in the area immediately below the molten pool of weld metal.

A check-back on the reported chemical analysis of the various heats of the steel, of "good" and "bad" weldability, failed to reveal any consistently noticeable variations from the nominal composition.

Also, the employment of other welding methods substantiated the difference in weldability. In fact, when spot testing with rod and flame types of welding, it was noted that on a given sample the rating of behavior from bad to good was in the order of carbon arc, metallic arc and flame type, respectively.

Metallurgical Study

The analysis of all this information seemed to indicate that these obvious differences in weldability were due to the minor constituents of the steel and their reactions during the welding process. Consequently, a thorough study was initiated, involving such phases as complete microscopic examinations, thermal and chemical analyses, grain size examination, carburization test, and examination for non-metallic inclusions.

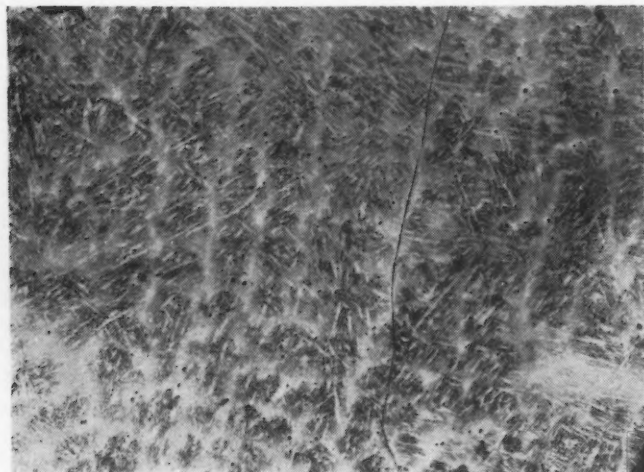
Examination of a number of

these faulty welds revealed that the causes of the wildness of the molten pool and also the eruptions which caused the pock marks were definitely associated with the presence of non-metallic inclusions of several kinds and amounts. The eruptions were found to have been solely caused by the decomposition of some of these inclusions due to heat alone, as witnessed by the fact that the source of the eruption was *below* the bottom of the weld pool, but in an area which was sufficiently plastic to give way under the pressure of gas generated by the break-down.

This in turn explained the differences in rating of weldability—the basic reason being the concentration of heat at the point of welding. The method giving the highest concentration (arc) apparently caused the most damage.

When the information from these

THE heat-affected area adjacent to the plate weld shown in Fig. 2.



MICROPHOTOGRAPH showing the narrow zone of high hardness between the plate weld (Fig. 2) and the heat-affected zone shown in Fig. 3.



tests was correlated, the result was the presentation of a clear-cut demonstration that the ordinary variations in the steelmaking process resulted in varying amounts of non-metallic inclusions, many of which were definitely detrimental to the welding characteristics of the metal. For example, even though the sulphur analyses were about 0.025 per cent or lower, it was found that lower sulphur contents were needed. The presence of sulphides in streamer types of inclusions always induces poor welding, even in steels with these low sulphur contents.

Furthermore, it soon became apparent that, while sulphur could not be accused of being the sole cause of the poor weldability, an accurate sulphur analysis could be relied upon to give a fairly accurate estimation of the welding properties.

Further corroboration of this evidence by one of the steel mill laboratories proved to be the stepping stone to the achievement of consistent production of steel of good weldability by altering the melting and deoxidation practices in such manner as to "clean up" the heat far more effectively.

This same kind of trouble has been encountered in some of the more highly alloyed steels which had behaved erratically in welding. One of these, bearing some 0.2 per cent aluminum as an alloying agent, was found to have the major portion of the Al present as Al_2O_3 , which persisted in coming out in the weld, thus causing considerable difficulty.

Steels which have hardening properties should be examined with particular care, for it is sometimes found that in or adjacent to the area of the junction of the weld metal and the parent stock there may occur regions of hardening (sometimes extremely small in area) which relieve themselves by very fine cracking. These micro-cracks (Fig. 1) may quite readily escape any casual examination of the weld. Nevertheless, they are dangerous, for they can easily be the cause of structural failure of the joint.

It is quite to be expected, that in steels which can be air-hardened to any extent, there will be an area adjacent to the weld that has been subjected to the treatment necessary to accomplish hardening. This action sometimes gives rise to trouble through cracking, but the occurrence is usually quite readily

detectable by ordinary hardness determinations. The smaller areas, however, such as mentioned above, are frequently missed by the usual hardness testing. Thus, in examining samples of material that may harden, it is advisable to make a thorough exploration of the hardness with a micro-hardness tester and of the micro-structure with the microscope.

brought about by the welding, as well as for any additional evidences of cracks, nitrides, and oxides, and for micro-hardness.

Previous reference was made to the presence of small areas of hardening which might be overlooked. However, careful microscopic examination of the micro-structure may give visual evidence of such areas, or they may be inferred from the



THE metallurgical microscope is used both for the visual examination of micro-structures and for making permanent photographs of these structures for more deliberate study and record purposes.

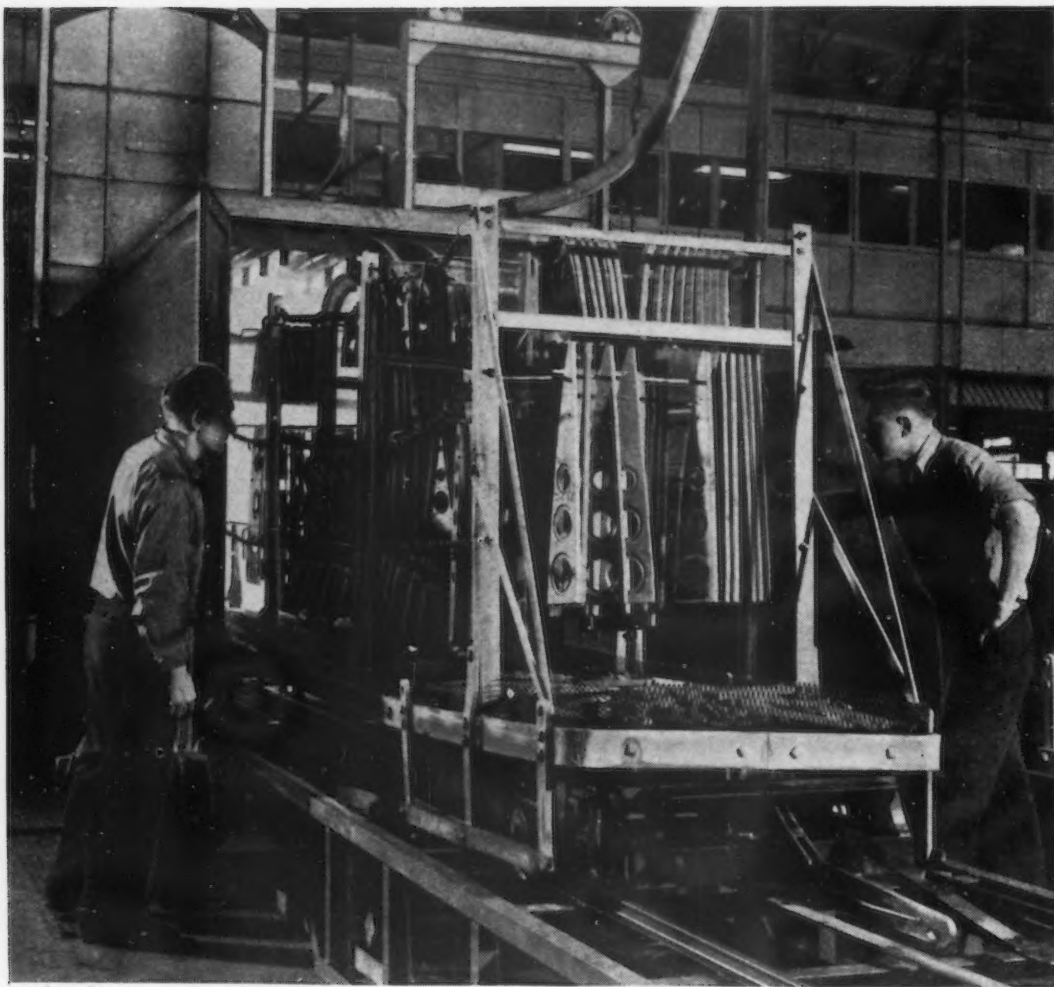
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The microscopic examination of welds should begin with a very carefully polished sample which can be thoroughly studied from the standpoint of porosity, micro-cracks, the kind, nature, and distribution of non-metallic inclusions in the unheated portions of the sample, and similar characteristics of inclusions in the various parts of the weld itself. This latter is of prime importance for the results of studies of this kind can frequently lead to the detection of improper welding conditions.

Following the examination of the unetched sample, it should be carefully etched, and the entire weld and heat-affected zone thoroughly explored for the structural changes

types of structure in evidence. An example of an occurrence of this kind is shown in the comparison of a plate weld (Fig. 2) and its adjoining heat-affected zone (Fig. 3) which had a very small area of high hardness between them (Fig. 4).

These few examples which have been cited should give sufficient evidence of the value of making a complete investigation of each new welding problem from a metallurgical viewpoint. The adoption of a fundamental policy of this kind is beneficial to the immediate problem under consideration; in addition, it provides a greater background of technical and scientific data for application to the problems of the future.



WORKMEN remove a rack of Airacobra parts from the quench cabinet, thus completing the heat treating operation for aluminum alloy parts at Bell Aircraft Corp. In the ceiling of the cabinet may be seen the rows of special quench nozzles which are used.

New Equipment Speeds Aluminum

WHEN a method of Dural heat treating requires rework or "reforming" by hand, the cost goes up. On small production lots comparatively few skilled men are required to bring parts to accurate shape after quench, provided there is sufficient "ice box" to permit even flow from heat treat to rework. Bell Aircraft foresaw during 1941 the necessity of improving the method and efficiency of this very important part of manufacture of the Army P-39 Airacobra.

The Dural heat treating furnace (excepting salt type for large work) then used was of "car-bottom" construction in which the bottom of the furnace is rolled away, allowing the rack of heat treat parts to be lowered quickly into a quench

tank underneath. With this installation equipment a means was provided to take the rack from under the furnace (under water) while the bottom of the furnace is rolled into place. Then hooks from a crane above lifted the rack up and to an unloading position beside the pit. Parts being heat treated were hung on wires or hooks and often nested or rotated when quickly dunked. The result was that many pieces were warped regardless of the care of the loading men.

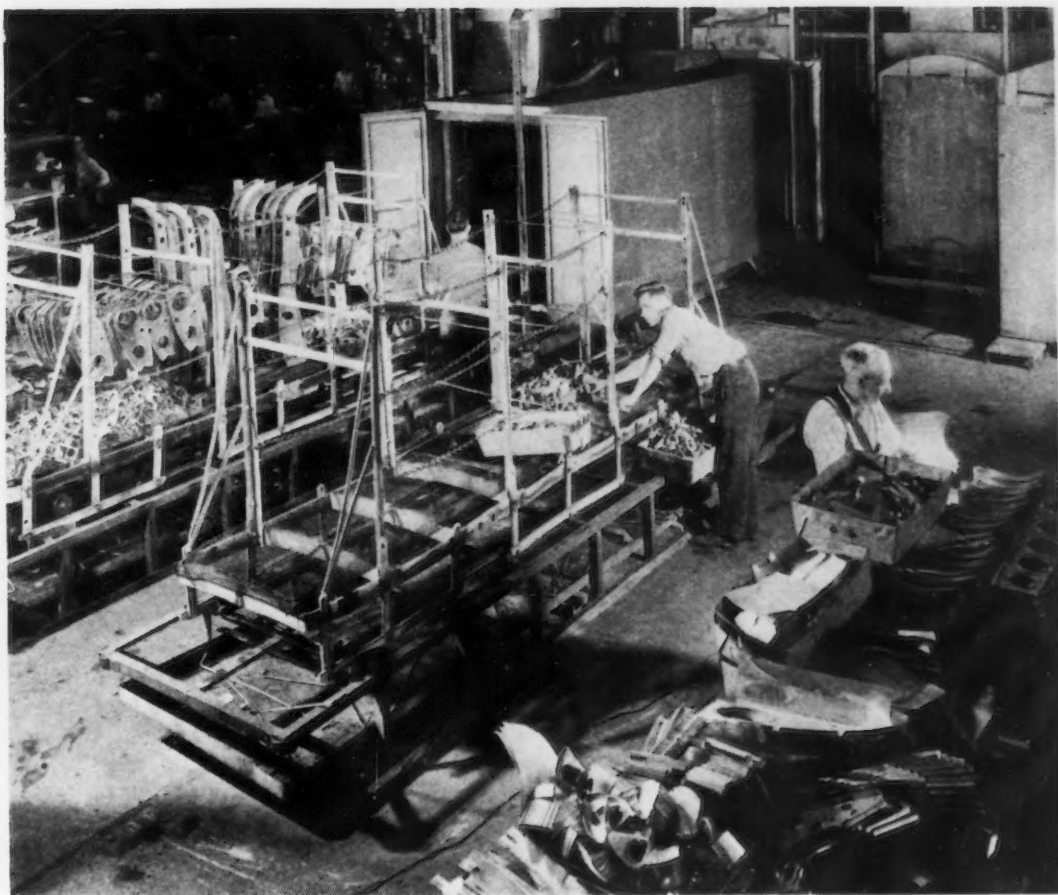
When more furnace capacity and faster racking and unloading was needed, instead of merely duplicating the old installation, studies were made of several improved types. As time was an important essential, it was decided to construct a quenching setup on a

somewhat oversize basis to insure performance with the thought that at a later date a more economically designed installation could be made.

The new heat treating unit consists of the original and one new 16 ft. long box Lindberg furnace. Car tracks laid in these furnaces are matched by tracks in the quenching booth which, in turn, passes across the door ends of the furnaces, acting as a transfer car. The booth also connects with either of two loading and unloading racks which permits bringing a load from the furnace through the quenching booth and then through doors of the booth to the unloading position.

The same quench booth is then moved to the other loading track where a rack on a special truck is

AN overall view of the aluminum alloy heat treating installation. In the foreground may be seen loading racks, and a stockpile of parts to be heat treated. In the upper center may be seen the quench cabinet, with doors open, and in the background stand the two furnaces used.



Heat Treating . .

By R. L. STEVENS and
JAMES WHITELEY

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Engineering Draftsman Respectively,
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transferred to the last opened furnace for heating. The car which carries the heat treating racks has a fall-away mechanism controlled by cams and operated by a roller chain in the quenching booth so it can be raised under a loaded rack on the loading platform, carried through the quenching booth and dropped when in place in the furnace, permitting the actual car or truck to be pulled from under quenching rack. Thus, one car can service two or more units of this type of heat treat and the car itself is only in the furnace about one-half minute.

Because the racks are not subject to heavy shocks, as in the case of the discarded heat treating procedure, much simpler construction is possible. No longer must special

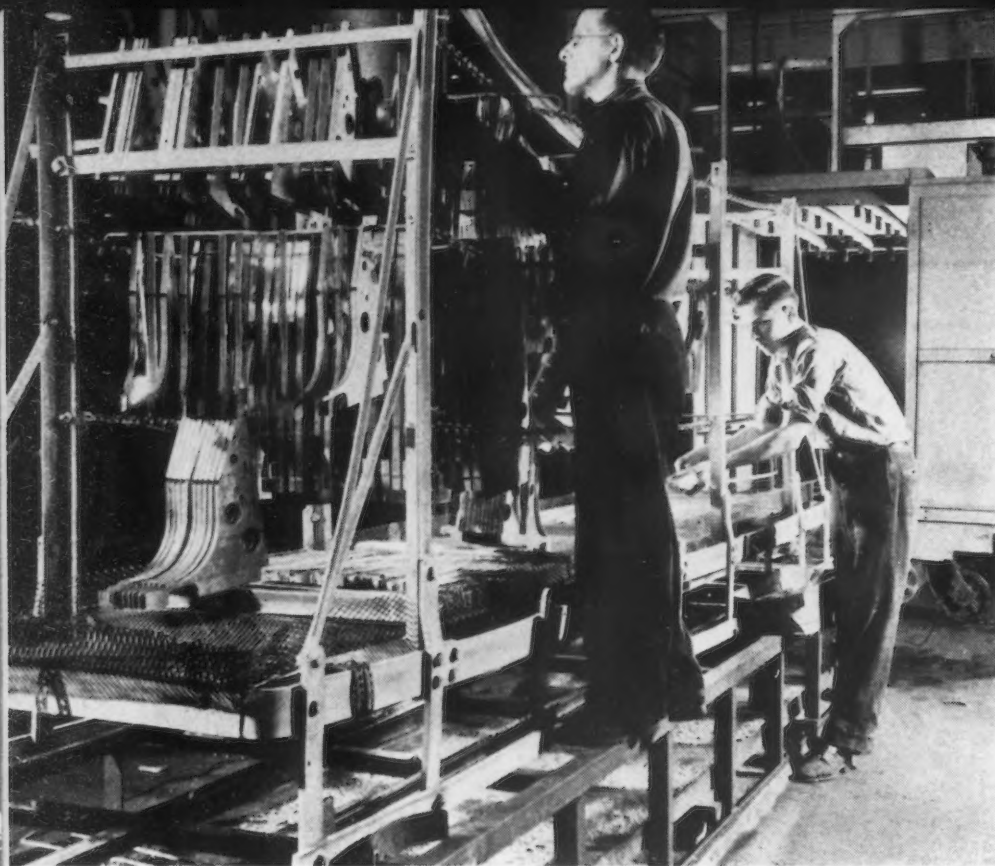
alloy steels be used; instead, ordinary, hot rolled strap steel is adequate. Construction is bolted, instead of welded, and upright members are connected by chains, instead of being held rigid by connecting, welded pipes.

Rods, with hooks at the ends, are loaded with parts and attached to the chains at the sides of the racks. Wire baskets serve as the bottoms of the racks. These baskets have sides about 4 in. high, and into them are loaded hundreds of small parts for heat treating. Because there is no rough handling of the parts during the heat treating process, including quenching, it is no longer necessary to fasten each piece securely as before, and consequently loading and unloading is greatly speeded.

The first loading operation consists of filling the basket with small parts, after which larger parts are hung on the rod which, in turn, are attached to the chains. Once the rack has been loaded, the carrying cart is rolled into position, and the rack is lifted off the floor by lever action.

The cycle of operations includes bringing the quench booth to the furnace door and while door is partly raised, sending the truck into the furnace under the rack where the cams cause the truck to raise the load, at which point the furnace door is completely opened and the loaded rack of parts is drawn into the quench booth.

Before the rack is drawn into the quench booth, 56 sprays of a novel, self-cleaning type of Bell design are



turned on. These sprays are positioned in the top of the booth, directly in the path of a large, high velocity air blast which carries the fog rapidly downward through underfloor ducts. As the loaded rack is pulled under this cold down draft, the aluminum alloy parts are cooled within a matter of seconds. When the car is brought to rest inside the booth, side sprays are turned on to cool the heavier metal of the rack itself, after which the rack is drawn out of the booth to the loading platform and the quench booth is moved to receive an incoming, loaded rack.

The nozzles used are credited with playing an important part in the overall success of the quenching method now used at Bell Aircraft. Conventional nozzles, if used for such work, would clog repeatedly as tiny particles of dirt lodged in the orifices, and the quenching apparatus would be "down" a great deal of time, during which the nozzles were removed for cleaning.

ABOVE

WORKMEN load a heat-treating rack with aluminum alloy parts. When loaded, the rack will move through the quench cabinet, seen in the rear, into one of two furnaces. On the floor of the rack are wire baskets, used to hold small parts.

o o o

RIGHT

AN interior view of the quenching cabinet used in the heat treating of aluminum alloy parts. In the ceiling may be seen the special nozzles used. Other nozzles are located in the sides of the cabinet.



Consequently, considerable experimentation was carried on, first in an effort to adapt the conventional nozzle types to do the job required, and later in the development of a new type of nozzle. The resulting nozzle, now being used, is made in two main parts, so designed that it flushed itself automatically twice during each spraying operation. This self-flushing action removes all particles of dirt which may have come through the water lines. Provision was made during the designing of the nozzle to obtain a solid spray, instead of the hollow spray which normally would develop.

Suitable cyclones are arranged in the underfloor ducts to separate the large volume of water from the air current before the air is passed through and out the roof of the building. Sufficient used water, which picks up oxides and dirt from the work, is drained from a water sump and fresh makeup is added for succeeding operation. The volume and pressure of water for the fog sprays and cooling spray is furnished by a 30 h.p. direct connected centrifugal pump while the air blast comes from a motor-driven blower of like power.

The entire installation was made with a minimum interruption to heat treating service and few unforeseen difficulties were encountered. With this system, the suspended parts are only slightly moved while being quenched; hence, after a little study of methods of loading the racks, the greater part of reforming due to warpage of parts has been eliminated. There has been no difficulty in meeting the strict inspection tests following heat treat and the installation has operated on a 24-hr. basis since completion, with no serious loss of time.

Worn Reamers Reforged to Size

WORN reamers having straight flutes are now being reformed back to original size by the Abrasive Engineering Corp., Spring Lake, Mich. The resizing of reamer bits involves heating the undersized bits to forging temperature and inserting in a special die. This die, gripping the entire reamer, forces the metal from the shaft out into the flutes by what might be compared to an upsetting process. In most instances as much as 0.020 to 0.030 in. can be added to the original diameter. At the present time, the company's dies will handle reamers from ½ to 3 in. nominal size.

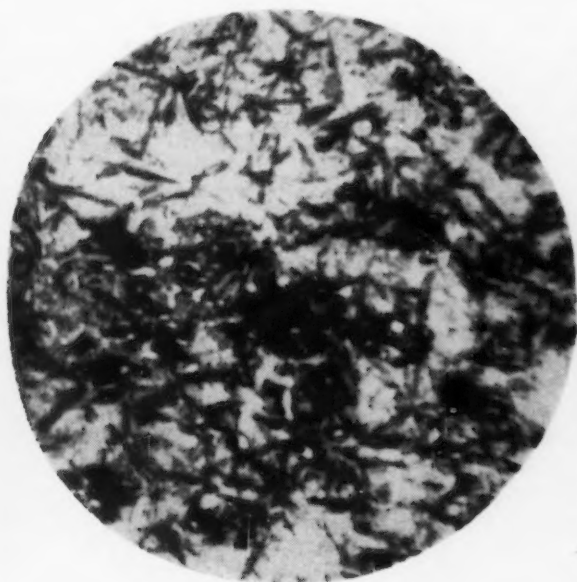
Special equipment is being used

for which patents have been applied. This machinery is so designed that the depth of the forging print is gaged from the surface of the back of each tooth, so as to displace only enough metal to increase the size the required amount. This operation may be repeated several times on heavy duty reamers.

Like other forged tools, the life of reamers so treated is greatly extended. This is due to the working of the material and the increase in density obtained. The microphotographs show the structure of a high speed steel reamer body in a part not affected by the restoring process and, for comparison, one

taken at the cutting edge of the same reamer after salvaging. The increased density is very apparent.

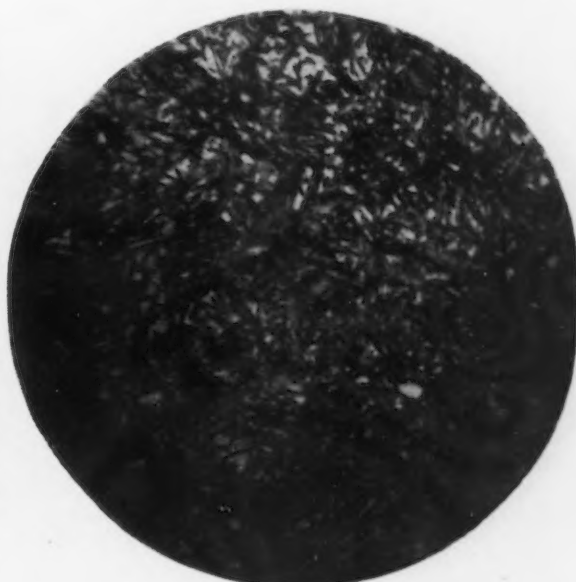
The process is applicable to all straight reamers except inserted blade and expansion reamers. This includes chucking reamers, jobbers reamers, rose reamers, bridge reamers and shell reamers. Due to the wide variation of the pitch in spiral reamers, as well as other factors, it has not been possible to prepare standard dies for handling this class of work. The company is resizing straight fluted reamers in from two to three weeks time on priorities ranging from A-1-a to A-1-j. It is expected that the size range will be expanded to below ½ in.



LEFT
STRUCTURE of high speed steel body at a point away from the cutting edge and out of the field of the restoring process. Magnification 500 times.

o o o

RIGHT
STEEL structure taken at cutting edge of same reamer, showing increased density after restoring to original size. Magnification 500 times.



Flame-Priming Method of

SURFACES which have been exposed to the corrosive effect of acid atmospheres usually have, in addition to a rust deposit described in the previous article, a mixture of acid salts which, being hygroscopic, tend to pick up and hold moisture. These salts cannot be removed completely by wire-brushing alone, no matter how thorough. By flame-priming, however, moisture is driven out of the salts, forming anhydrous, granulated salts which can be brushed away, leaving a clean surface ideally prepared to receive the protective coating.

Heat Transfer

When the flame-priming head is passed over a steel surface, a superficial layer of the metal is momentarily raised to an extremely high temperature because of the high rate of heat transfer from the flames to the plate. After the flames have passed on, this small

amount of heat in the thin, high-temperature zone is given up to the base metal. If the surface is coated with a layer of scale that has a low heat conductivity, the instantaneous surface temperature is comparatively high, since heat is conveyed into the base metal slowly. However, if the metal surface is relatively free of scale, the rate of heat transfer is high, and the maximum temperature reached on the surface is lower. It can be reasoned from this that where rust and mill

By E. W. DECK

Development Engineer,
Linde Air Products Co.

scale exist, their low thermal conductivity will effect high superficial temperatures which will produce the desired dehydrating action.

The base metal temperature resulting from flame-priming likewise is affected by the thickness of the steel being treated. The final temperatures of the relatively thin plate will, of course, be high when compared with the temperature of a thicker plate subjected to identical treatment. Then too, some structures are flame-primed on both sides, such as I-beams, while others are flame-primed on one surface only, such as storage tanks. Consequently, because of these variations, it is impossible to set the exact temperature of steel surfaces after flame-priming, although in most instances it is in the neighborhood of from 125 to 150 deg. F.

Effect of Heat on Coatings

When paint is applied on a warm surface, its corrosion resistance is

FIG. 4—The results of these authoritative tests indicate the superior corrosion-resistant properties of surfaces flame-primed before painting.

SURFACE TREATMENTS	PRIOR CONDITION OF STEEL	STANDARD RED LEAD IN LINSEED OIL						IRON OXIDE IN LINSEED OIL				"SYNTHETIC" RED LEAD-ALKYD.				"POTTSTOWN" BENEFICIATED RED LEAD			
		STANDARD A- FILM THICKNESS		G-SAME AS A		J-INCREASED J- FILM THICKNESS		STANDARD C- FILM THICKNESS		INCREASED K- FILM THICKNESS		STANDARD E- FILM THICKNESS		INCR. L- FILM THICK		STANDARD H- FILM THICKNESS		INCR. M- FILM THICK.	
		SHIP	PHILA.	SHIP	PHILA.	SHIP	PHILA.	SHIP	PHILA.	SHIP	PHILA.	SHIP	PHILA.	PHILA.	PHILA.	SHIP	PHILA.	PHILA.	PHILA.
1 "IDEAL" SAND BLAST (COARSE GRIT)	NEW																		
	WEATHERED	AIW1S	AIW1P																
9 Do. FINE GRIT	NEW		AIN9P						CIN9P										
2 "PRACTICAL" SAND BLAST	NEW	AIN2S	AIN2P			JIN2P	CIN2S	CIN2P		KIN2P	EIN2S	EIN2P	LIN2P					MIN2P	
	WEATHERED	AIW2S	AIW2P			JIW2S	JIW2P	CIW2S	CIW2P	KIW2S	KIW2P	EIW2S	EIW2P						
3 PARTIAL SAND BLAST	NEW	AIN3S	AIN3P					CIN3S	CIN3P										
	WEATHERED	AIW3S	AIW3P					CIW3S	CIW3P										
4 CORRECT FLAME-CLEANING	NEW	AIN4S	AIN4P	GIN4S	GIN4P			CIN4S	CIN4P			EIN4S	EIN4P			HIN4S	HIN4P		
	WEATHERED	AIW4S	AIW4P	GIW4S	GIW4P			CIW4S	CIW4P			EIW4S	EIW4P			HIW4S	HIW4P		
5 RAPID FLAME-CLEANING	NEW	AIN5S	AIN5P					CIN5S	CIN5P										
	WEATHERED	AIW5S	AIW5P					CIW5S	CIW5P										
6 SLOW FLAME-CLEANING	NEW	AIN6S	AIN6P					CIN6S	CIN6P										
	WEATHERED	AIW6S	AIW6P					CIW6S	CIW6P										
7 MOISTENED FLAME-CLEANING	NEW																		
	WEATHERED	AIW7S	AIW7P																
8 ORDINARY HAND-CLEANING	NEW	AIN8S	AIN8P	GIN8S	GIN8P			CIN8S	CIN8P			EIN8S	EIN8P			HIN8S	HIN8P		
	WEATHERED	AIW8S	AIW8P	GIW8S	GIW8P			CIW8S	CIW8P			EIW8S	EIW8P			HIW8S	HIW8P		

SHIP signifies by vessel to Seattle and return to racks at Bethlehem.
PHILA. " Du Pont racks at Phila.

Rating Scale as used on these Diagrams:-
Ratings are average of front and back of specimens.
Raters recorded terms denoting amount of rust in evidence

Absent	Call of	0
Very slight		5
Slight		30
Considerable		60
Bad		95
Very Bad		100

Bethlehem Steel Co., Sept. 1940.

Preparing Steel Surfaces

increased. The removal of contaminants makes it possible for the vehicle to reach the steel surface where the polar attraction forces can exert themselves to produce a greatly increased bonding strength. It is this property which arrests corrosion-creeping. The heat increases mobility and hastens the evaporation of solvents. The highest temperature being at the metal interface, the solvents do not tend to be trapped by any skin formation and consequently voids and blisters are less frequent. The rate of setting is speeded up by an increase in polymerization of the vehicle caused by the baking action of the heat. This produces a tougher and more lasting film (*Appendix 10*) as well as making possible a desirable reduction in drier content.

Flame-priming and painting should therefore proceed as a continuous operation. The operator handling the flame-priming blow-pipe should be followed immediately by the helper sweeping down the surface, who in turn is followed by the painter.

Also under the subject of heat effects, comes the question of the possibility of distortion resulting from flame-priming. When the process is conducted in accordance with recommended procedures, distortion may be dismissed as a problem—because, although temperatures are high, the quantity of heat actually induced into the base metal is low (because of the speed with which the flames are passed over the surface). It has actually been shown that the deflection in a structural member that has been flame-primed is less than deflection produced by radiant heat from the sun which causes a continuous temperature differential between the exposed and shaded sides.

Evaluation Tests

Flame-priming shows up consistently well in exposure tests. Some authorities feel that the general value of panel tests, as indications of corrosion resistance, is open to

... The previous portion of this article described flame-priming as a process consisting of "scrubbing" steel surfaces with a series of high velocity, high temperature flames with the result that all loose mill scale is removed by sudden thermal expansion and rust is dehydrated and replaced by stable oxides. In addition, all contaminants, such as oil, are consumed and the steel surfaces are left clean and warm, ready for painting after merely wiping free of loosened foreign materials. The following article concludes the discussion.

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question because conditions established in the tests do not always accurately exemplify all conditions. Consistent results in many tests overcome these objections. A number of tests have been run in the past, conducted by users of flame-priming under their own conditions and with their own materials, with results uniformly favorable to flame-priming. Detailed reports of these tests are not generally available. In a few cases authoritative tests have been conducted.

One series of tests, however, reported by the American Institute of Steel Construction, would appear to be representative, authoritative, and conclusive. These tests were conducted by one of the large steel fabricators working in conjunction with a large and reputable paint laboratory. With the knowledge and facilities of both groups, a series of thorough tests was planned and executed in which flame-priming was compared with other processes in general use. The scope and execution of the program included the testing of three common methods of surface preparation—flame-priming, sandblasting, and hand-brushing—with variations of each. Three grades of primers were used:

Iron oxide and linseed oil, red lead and linseed oil, and a premium-grade proprietary brand of primer. Moderate-sized structural shapes were used as specimens and were exposed in an inland industrial area and in a salt-air atmosphere on board ship. The exposure period for a single coat was one year.

The three methods of surface preparation used included "the best sandblasting practice that could be obtained in connection with heavy fabrication, such as bridge girders," flame-priming in accordance with the specifications of the American Institute of Steel Construction, and hand-cleaning in accordance with the best practice followed by reputable operators working under the usual inspection conditions. The results are shown in the chart in Fig. 4. Dark areas represent the relative progress of corrosion as indicated in the legend shown in the lower right. Both new and weathered steels were used. Thus, in one group of specimens, the mill scale was intact and free of moisture, while in the other, large portions of scale had rusted off and exposed areas were rust coated.

As expected, the new steel, fresh from the mill and painted immedi-

ately with the scale intact and free of moisture, stood up well in service because of the added protection provided by the mill scale. Since steel in this condition is seldom, if ever, available to fabricators, the results are of only academic importance. They show that the intact mill scale affords protection if dry. If it has been exposed, the best method to artificially simulate the desired surface condition is to flame-prime and paint it as soon as possible. This conclusion is confirmed by Tice (*Appendix 8A*) in a similar set of tests.

As for the question of sandblasting versus flame-priming, compare the results obtained. It is quite apparent that the flame-primed specimens stood up well by comparison, even when painted with less expensive iron oxide, non-inhibitive paint. In fact, these flame-primed specimens stood up better than the more expensive type of paints on sandblasted specimens. This verifies the claim that special paints are not required for use with the process.

It is particularly notable that at the end of one year the red lead and linseed-oil specimens on flame-primed new steel were in perfect condition. The tests also indicated that there is a latitude in the rates of speed used in flame-priming, which will achieve acceptable results. This indicates that recommended practices are more thorough than is actually required.

Among conclusions drawn from this series of tests was the report that "flame-cleaning conducted under the Institute's tentative specification and with considerable latitude in the rate of passage of the flame can give very satisfactory results—results superior in fact to



ABOVE

FIG. 5—These operators are flame-priming, sweeping, and painting part of an order for 4000 tons of structural steel members used in the construction of an overhead railway system.

BELOW

FIG. 6—Spillways such as the ones in this large dam are another of the important applications of flame-priming. The process was applied after the fabrication had been completed.



those obtained by sandblasting if the latter is what was employed in these tests" (*Appendix 9*).

Flame-Priming Operating Data

Visual evidence of the reaction of the steel surface under the priming flames is the real index of the correct speed for blowpipe travel. When rust is present, the formation of black magnetite indicates that the rust has been dehydrated satisfactorily. When the reaction is carried one step farther and silvery streaks appear in the black magnetite, this is an indication that the flame-priming is even more thorough than is really necessary. When the problem is merely one of removing loose scale, the desired reaction is readily visible in the "popping off" of the scale. As indicated in Fig. 4 the tendency is to do a more thorough job than necessary.

For the purpose of estimating the time it would take to do a certain job, estimates of speed can be made. The rates of travel for the blowpipe vary depending upon surface conditions and the type of structure. For example, speeds as high as 50 ft. per min. have been obtained on relatively new I-beams. However, for estimating purposes it is recommended that the conservative figure of about 35 ft. per min. be used. When flame-priming is being applied to thick plates that are heavily scaled, this speed might have to be reduced to about 15 ft. per min. Very wet surfaces must be treated more slowly than those leaving dry rust on them.

A 6-in. flame-priming head used about 137 cu. ft. of oxygen per hr. when operated according to recommendations. If the basic speed of 35 ft. per min. is attained, the head would treat 1035 ft. per hr. and

would use 13 cu. ft. each of oxygen and acetylene for every 100 sq. ft. of surface. On riveted areas, the speed would be about half.

Applications of Flame-Priming

Practically any metal surface which is to be painted can profitably be flame-primed so as to improve the quality, corrosion resistance, and life of the paint coat. The process is being used to an ever-increasing extent for this purpose, for such important applications as structural steelwork, storage tanks, dams, locks, piling, railroad cars, combat tank hulls, bombs, shells, ship hulls and deck plates, steelwork in subway construction, plane hangars, and pipe lines.

The process received its first wide acceptance in the structural steel industry. Many important bridge structures have been prepared for protective painting by this method, among them being the new International Rainbow Bridge at Niagara Falls. Other important projects of a similar nature include the structural steelwork of overhead parkways and of dam spillways, illustrated in Figs. 5 and 6.

Another example of the efficient work being done with flame-priming is the new Chicago subway system now under construction. Here the advantages of flame-priming are most pronounced because the structures are virtually dripping with wet rust which has formed in the damp compressed air atmosphere during erection. It is not practical to prime this steelwork prior to erection because of marring in handling through the air locks. The portability of the flame-priming equipment solves the difficulty of cleaning after erection, see Fig. 7.

Flame-priming also is seeing widespread use in connection with the painting of storage tanks, gas holders, and similar structures. These usually are flame-primed after being assembled and tested. There are, of course, certain exceptions to this practice, such as gas holders of the floating-bell type, in which it is not practical to clean between the bell and the shell after erection. Work of this type is flame-primed at the shop prior to shipment, leaving unpainted a narrow zone on either side of the weld area, to be finished after leak testing.

In the past, storage tanks were often allowed to weather in the open after erection and before painting, to remove the mill scale.

For superior corrosion resistance, such tanks are now being flame-primed immediately after erection to preserve as much as possible of the tight scale, the operation taking place, of course, before the tank is filled with flammable contents. This eliminates the unsightly weathering period, permits the entire job to be accomplished quickly at the time of erection, and improves the corrosion resistance as

shipment or after installation. In view of the likelihood of the prime coat being marred in shipment, however, it is usually desirable to perform the flame-priming on location. To avoid rusting taking place in transit, it sometimes proves advisable to coat the surface with an inexpensive lacquer to act as a temporary protection and preserve mill scale. This is burned away in the flame-priming operation. In in-

FIG. 7—Flame-priming is practically indispensable for preparing structural steel members in subways where they must be painted after erection in a damp atmosphere. This is a view of operations during construction of the new Chicago subway.



shown by tests and discussed previously. (Appendix 8A.)

Some storage tanks which are to be located underground may be more economically flame-primed and painted before shipment from the fabricating shop. In this connection, it is interesting to note how the simplicity and portability of the flame-priming equipment solved a production problem for one fabricator of such tanks. Because of increased production, space inside the shop was at a premium. The simplicity of the equipment and materials needed for flame-priming made possible an unusually efficient setup in the crane yard, adjacent to a railroad siding where the operators had considerable freedom and where handling facilities were ideal. Under such conditions, workmanship was naturally of a high quality.

Pressure vessels likewise may be flame-primed and painted prior to

stances where it is preferred to have the prime coat applied at the fabricators, it is advisable to include "rigger's eyes" in the vessel design so that the work can be handled without damaging the paint during shipment and installation.

Another timely application of flame-priming is its use in connection with airplane hangar doors. Flame-priming and painting are carried out at top speed and offer lasting protection and efficient operation in the absence of corrosion. Specifications of the U. S. Navy Bureau of Yards and Docks require the process on underground and waterfront equipment and structures, such as piling, storage tanks, and pipe lines. Flame-priming is ideally suited to this type of work because of its portability which speeds construction under all-weather conditions. During flame-priming even those surfaces

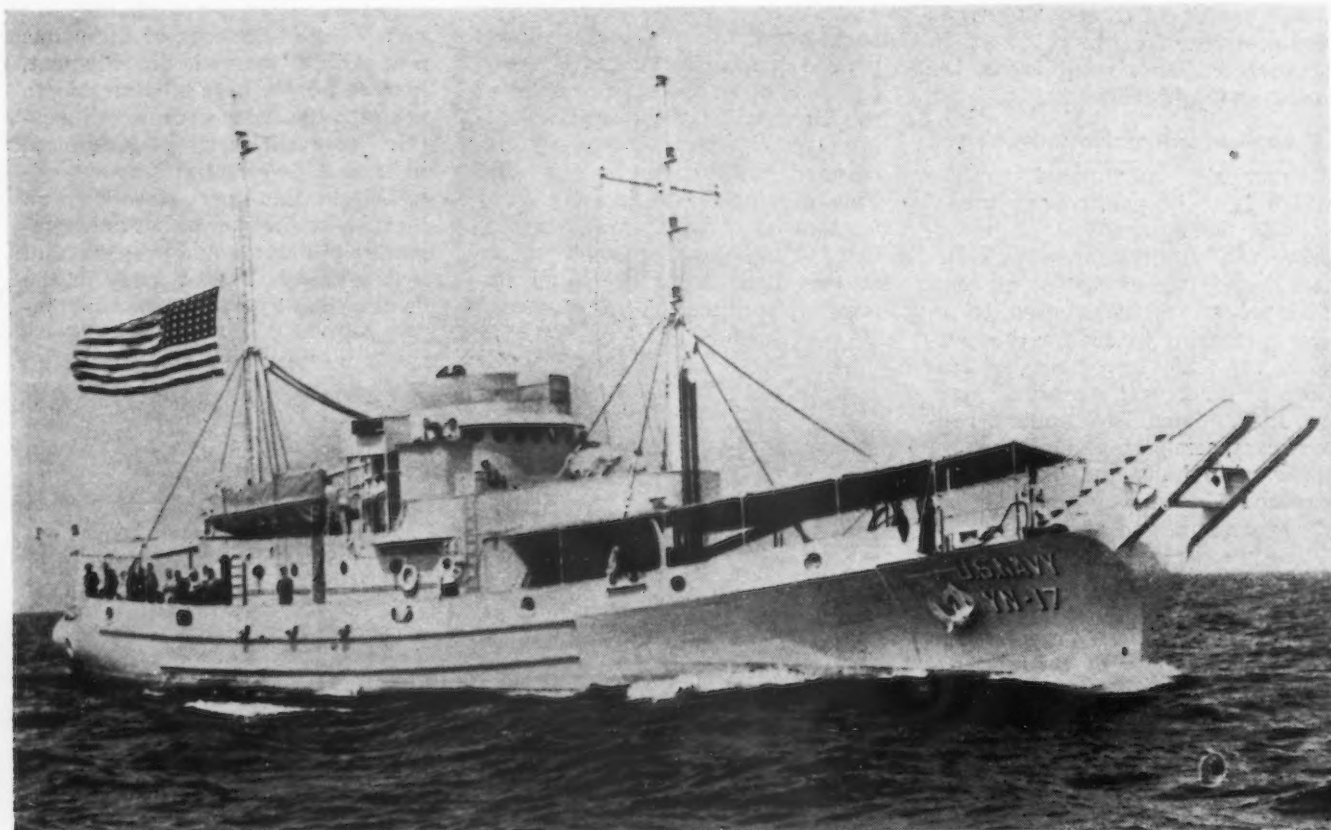


FIG. 8—This net tender, designed for ocean service, is one of a group of boats in which flame-priming was applied for maximum protection.

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that are normally wet from salt spray and high humidity are rendered dry, and remain so until painting. After the piling has been driven, scar marks caused by the driving operation are touched up at low tide by flame-priming and coating.

The U. S. Navy Bureau of Ships has issued specifications for flame-priming steel for ship hulls. Hull plates are treated on arrival at the yard and stored in the painted condition. The weld zones can be painted while still warm from welding or they may be flame-primed just prior to painting. Fig. 8 shows one of a group of net-tenders that were prepared by this method.

The process also finds increasing application in the reconditioning of previously painted surfaces that have become badly corroded and

pitted, particularly industrial structures subjected to highly corrosive conditions. The action of the flames pops the heavy rust loose even in deep pits and drives off any chemical salts, acids or gases that may be clinging to the surface. Materials, such as pipe that has been underground, are freed of mud and moisture simultaneously.

Boats and barges likewise are flame-primed before repainting. Recently a barge that had been exposed to acid water was docked for

maintenance painting. The management of a boat yard, quick to realize the need for removing all traces of acid salts before painting, recommended flame-priming and was awarded the reconditioning project. The bottom of the hull was flame-primed and painted in dry-dock, and the remainder of the hull completed after the barge had been floated again. The process is now used on practically all work at this yard.

Appendix

(8A) E. A. Tice, Tests Show Effectiveness of Flame Cleaning Structural Steel, *Steel*, Feb. 9, 1942.

(9) American Institute of Steel Construction, The Preparation of Structural Steel Surfaces for Painting.

(10) E. F. Bennett, A review of Driers and Drying, p. 10.

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Utility Enamel Finishes for Light Alloy Castings

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IN industrial enameling, the "best" finish cannot always be applied for reasons of cost. A discussion of this subject in *Light Metals*, London, June, 1942, points out that this is particularly true of castings because of the labor cost involved in the preparatory operations of grinding and buffing.

The more perfect a finish needs to be with respect to smoothness (whether a matt, semi-gloss or bright final luster is specified), the greater the labor time involved. Labor is an appreciable item in cost, and although machines are available for automatic polishing, their applications are limited to simple profiles, and manual methods have more generally to be adopted. Hence any range of finishes that can contribute to minimizing the hand mechanical operations, while at the same time insuring durability and appearance characteristics, warrant serious consideration.

A number of what might well be designated "broken pattern" finishes are available, that go a long way towards satisfying these criteria. Outstanding enamel finishes of this type are briefly considered in the following under convenient classifications:

- (1) Stoved (baked) crinkle finishes.
- (2) Air-drying cracking finishes.
- (3) Sputtered finishes.

Stoved Crinkle Finishes

In this country (England) there are two types of stoved or baked crinkle finishes commonly available. These are usually referred to as crystallizing, or crystalline finishes, and ripple or brocade finishes respectively. Actually they are very similar in all respects except pat-

... A consideration of the technique of providing light alloys, particularly light castings, with applied finishes of utilitarian and decorative value.

tern. The varnishes or enamels used for their production are china-wood-oil base materials in which the oil has had a special pretreatment by heat and which contain appropriate driers. The pattern of the finish is then produced by the condition of stoving, after which full stoving at an appropriate temperature to complete hardening-off takes place.

The crystalline variety gives a pattern of polygonal grains in which the varnish or enamel has shrunk from the crystal centers and risen around the boundaries so that a thin finish over the crystal areas results with a raised pattern around their peripheries.

In the case of the brocade finishes, the pattern is a regular ripple without the grain formation. This difference is largely achieved by virtue of the nature of the driers, those in the crystallizing class having mainly a volume effect, and comprising lead or manganese driers, whereas those in the brocade class have an excessive surface effect and consist largely of cobalt compounds. The media are, in practice, nearly always applied by spray, although there is no objection to

brushing or dipping. A high pressure spray of 70 to 80 lb. per sq. in. is preferable although other pressures can be utilized. In this connection, the formulation of the material has to be such that will be suitable for the pressure to be employed, but no difficulty whatsoever will be encountered in such modifications. The media can be sprayed on almost any material that will withstand the stoving conditions, and may be applied over suitable baked undercoats or to the base material itself.

The pattern is developed by preliminary stoving, which, in general, occurs between 160 and 180 deg. F., for which work may either be inserted into the oven already at this temperature or loaded into the cold oven and fairly rapidly brought up to temperature. In the case of the crystallizing finishes, generally a gas heated oven having the products of combustion of the gas passing into the oven is essential in order to develop the pattern, although black crystallizing varnishes are available for which this is not necessary. The active feature here appears to be the sulphurous acid constituent in the gas product. An equally effective substitute is to insert a small tray of nitric acid in the base of the oven.

For the brocade finishes, such oven atmospheric conditions are not necessary, and these bake equally well in electric, steam or gas ovens. Once the pattern has been formed (which takes from 10 to 15 min.,

**Fifty-third in a series
of articles on the technical
and commercial
aspects of metal finishing
and cleaning.**

TABLE I
Stoving Crystal and Brocade Enamels

No.	Type	Color	Composition, Per Cent		Specific Gravity at 77 Deg. F.	Viscosity at 77 Deg. F. Centipoises
			Volatile Spirit	Total Solids		
1	Crystal	Dull brown	24.6	75.4	1.045	1250
2	Crystal	Bright nut brown	21.6	78.4	1.074	1330
3	Crystal	Glossy black	28.7	71.3	0.950	2400
4	Crystal	Light gray	28.5	71.5	1.225	355
5	Crystal	Eggshell black	31.4	68.6	0.945	940
6	Crystal	Clear varnish	34.1	65.9	0.941	490
7	Brocade	Dove gray	23.6	76.4	1.112	1240
8	Brocade	Clear varnish	36.4	63.6	0.945	425
9	Brocade	Eggshell black	37.5	62.5	0.958	910
10	Brocade	Dull brown	31.3	68.7	1.051	1000
11	Brocade	Glossy green	33.0	67.0	1.062	660

and it must be formed rapidly before the enamel sets by the natural effect of stoving conditions), the finish can then be hardened off by long stoving at the same temperature, or by shorter baking at some higher temperature: 30 min. to 1 hr. at 250 deg. F. is usually employed. Color only is a restriction, and, for pale shades, 220 deg. F. maximum would have to be observed, whereas 302 or even 350 deg. F. can be utilized with every satisfaction for dark shades.

The size of the pattern is determined for a given enamel or varnish entirely by the thickness of coating. Heavy coatings give a heavy, coarse or large pattern, whereas thin coatings give a fine or small pattern. Consequently, the pattern is indirectly affected by spray pressure, size of gun nozzle, degree of dilution of the material and spray distance, and upon whether the operator is so-called "heavy handed" or otherwise. All these points are capable of close control. At the same time, it has to be appreciated that, in dealing with irregular shaped articles where

overlapping spray is inevitable, some variation in grain size will be unavoidable. Also, in the case of panels, great care has to be taken to obtain no undue variation where the spray overlaps in traveling to and fro as well as at the points where reversal of the direction of the spray occurs. This can be greatly minimized by double or cross spraying with very thin coats, first in one direction and then in the other.

Regarding durability of these finishes, as they are china-wood-oil-base materials, fully baked, they are among the most durable of known organic finishes. They adhere well to any base metal, including the light metals, with or without preliminary abrasive blasting. However, it has to be borne in mind that the centers of the crystals and the bottoms of the ripples are comparatively thin, and, in general, it is advisable to have a suitable baked primer. These baked primers may be of specially formulated china-wood-oil base, or of the normal types, such as a universal black undercoating, a black rubber first

coating, or a red oxide or zinc-chromate-pigmented primer. The chief point to bear in mind in connection with the primer is that it should have been subjected to baking conditions just as severe as those to be imposed upon the crinkle finish with respect to temperature and time. Otherwise, the ground coat becomes unduly stressed during the baking of the finishing coats.

As to range of colors, these materials can be obtained in the full range and in transparent or opaque varieties. Furthermore, the brocade finishes can be oversprayed from an angle (for example, with air-drying cellulose media), whereby the high portions become coated on one side and not on the other, thus producing shot effects.

The only real objection is the fact that the roughness of the finish tends to gather up dust and dirt, although this can quite readily be brushed out with a bristle brush, and this disadvantage is not nearly so marked with the brocade as with the crystallizing finishes, and even on such complex equipment as instruments, photographic apparatus, radio sets and the like, no undue troubles are encountered in this direction.

From the manufacturing angle, a really attractive feature of these finishes is the fact that, by virtue of the pattern produced, they mask all the minor blemishes in the base materials, such as dents, rolling marks, minor castings blemishes, and so forth. Moreover, to a considerable degree, they fail to reveal the objectionable tiny dust pips usually gathered up during enameling that on "flat" finishes have to be burnished off. They are, therefore, a really attractive proposition for light alloy castings, as well as for the aluminum and aluminum alloy stampings from sheet work, or for cabinet equipment.

On the other hand, from the enameling shop point of view, such finishes are a nuisance unless they are employed on an extensive scale. It is inconvenient when standard stoving products are passing through to have to specially adjust ovens to suit these materials, while, moreover, the enamels, by virtue of their nature, tend to gel and skin rapidly, and so become expensive unless used on a large scale, when opened containers can be completely used. When, however, they are exploited to their fullest extent, normal shop equipment can be employed and adjustments cease to be

TABLE II
Stoving Undercoats for Crinkling Enamels

No.	Color	Composition, Per Cent		Specific Gravity at 77 Deg. F.	Viscosity at 77 Deg. F. Centipoises
		Volatile Spirit	Total Solids		
1	Black rubber first coating, low temp.	40.5	59.5	0.902	770
2	Black rubber first coating, high temp.	39.5	60.5	0.923	680
3	Red oxide synthetic	35.0	65.0	1.495	510
4	Zinc chromate synthetic	55.0	45.0	1.105	290

disadvantageous economically or technically.

Detailed laboratory characteristics are given in the attached tables for the special enamels to which reference has been made. Table I refers to crystal and brocade enamels, all of which are suitable for spray application at 40 to 60 lb. air pressure. For all of them the artistic patterns were developed by entering a hot stove at 150 to 170 deg. F. and holding for 30 min., and then completing the stoving by raising to 250 deg. F. and holding for 1 hr., except for the delicate shades (Nos. 4, 6, 7 and 8), which were final baked in 2 hr. at 220 deg. F. It will be noted that the majority of these media are of the heavy consistency type, but not greatly different from the corresponding oil-variety baking enamels and varnishes.

Table II refers to suitable undercoats, of which the black ones are the most generally employed. Nos. 1 and 2 stove respectively in 30 min. at 482 to 500 deg. F., and 2 hr. at 280 to 302 deg. F. However, the red oxide or zinc chromate undercoats can be used with advantage on aluminum alloys, while the zinc chromate should definitely be chosen for magnesium alloys. Both these media may be stoved in 30 min. at 116 deg. F. Where desired, of course, a carefully chosen colored undercoat can be used to suit the color of the finishing coat whatever this may be.

Air Drying Cracking Finishes

The air drying cracking finishes are of the nitro-cellulose-base type, and their formation is based on the use of a specially formulated medium which, in rapidly drying, cracks into grain formation, leaving an inter-boundary spacing between the grains. This medium is applied by spray and is actually the second coat of the finish, being sandwiched between the ground and top coats.

The ground material is a normal cellulose enamel, usually matt or eggshell, and it is applied in the normal way and given the normal drying time of $\frac{1}{2}$ to 4 hr. before applying the cracking coat. The ground coat provides the color of the intergranular cracks, while the cracking coat provides that of the grains or crystals. The ground coat must also provide for adhesion.

The cracks between the grains will vary in size according to conditions of application. Heavy coats give a large grain and large boundary, whereas light coats give a finer pattern. It is essential, final-

TABLE III
Cellulose Cracking Finishes—Laboratory Characteristics of Media

No.	Type	Color	Composition, Per Cent		Specific Gravity at 77 Deg. F.	Viscosity at 77 Deg. F. Centipoises
			Volatile Spirit	Total Solids		
1	Ground	Black	79.3	20.7	0.924	780
2	Ground	Blue	64.7	35.3	1.045	615
3	Ground	Red	62.6	37.4	1.020	840
4	Ground	Yellow	62.1	37.9	1.028	950
5	Ground	Green	63.5	36.5	1.031	895
6	Ground	White	59.3	40.7	1.048	1150
7	Cracking	Black	82.5	17.5	0.908	60
8	Cracking	Brown	77.6	22.4	1.005	70
9	Top	Clear colorless	86.5	13.5	0.935	480
10	Top	Red tinted	80.0	20.0	0.878	410
11	Top	Black opaque	78.6	21.4	0.918	690
12	Top	Clear blue	80.7	19.3	0.865	415

ly, to apply over this layer a lacquer coating in order to insure the cracked layer retains its adhesion. The top coat is a normal cellulose material, and most generally employed is a clear lacquer tinted to the appropriate color. On the other hand, quite useful finishes are secured with opaque enamels over the cracked coating.

Table III records laboratory characteristics of the cellulose media. It will be seen that the ground materials are normal medium to heavy consistency enamels, and the top coats are orthodox medium-bodied lacquers. The cracking media, on the contrary, are of very low consistency.

Cellulose finishes have the attributes of being easily manipulable in the enameling shop, air drying, and of providing hard films having good moisture impermeability properties. On the other hand, they age rela-

tively rapidly with consequent loss of adhesion. Such finishes can be quite satisfactory on large components not subjected to flexing, but are doubtful on small components subjected to much handling in assembly operations or to service conditions mechanically arduous with respect to impact or vibration. This shortcoming is mitigated either by a surface preparation by abrasive blasting or by the use of a stoved priming coat of suitable formulation. The latter is to be preferred, and the zinc chromate type advocated for both aluminum and magnesium light alloys.

The cellulose cracking finishes are smooth by virtue of the top lacquer coat, and exceedingly neat and attractive. A wide range of useful artistic effects is practicable by choice of contrasting or toning colors for ground and cracking coats.

TABLE IV
Stoving Synthetic Media, Including Enamels for Ground Coats, or for Sputter. Varnish for Top Coats

No.	Color	Composition, Per Cent		Specific Gravity at 77 Deg. F.	Viscosity at 77 Deg. F. Centipoises
		Volatile Spirit	Total Solids		
1	Dark gray enamel	43.5	66.5	1.210	300
2	Light gray enamel	24.5	75.5	1.755	510
3	Dark green enamel	35.5	64.5	1.291	175
4	Light green enamel	47.2	52.8	1.132	180
5	Dark blue enamel	44.1	55.9	1.165	310
6	Light blue enamel	38.0	62.0	1.285	170
7	White enamel	48.5	51.5	1.225	385
8	Clear varnish	44.0	56.0	0.925	240

In appearance, "sputtered" finishes comprise rounded droplets of one color distributed over a ground color, and they obviously offer a sound means of providing a mask to surface blemishes. One method for their production is to apply in the normal manner a first coat of cellulose enamel and allow to dry. Water is then sputtered on from a specially adjusted spray gun to form the pattern, and a short period allowed in which to enable fine water mist to dry off. A coat of colored cellulose enamel is then sprayed over, and, when just dry, the surface is wiped with a cloth, thereby removing the water drops with the cellulose covering them. A final coat of clear lacquer is applied. The "drop" color is thus that of the first coating and the main color that of the second spray.

The cellulose finish has the same objections with respect to adhesion and aging as stated for cracking finishes, and the same additional precautions are advisable. In consequence, it is relatively expensive, and a preferred process uses a stoving combination as given below.

A spray coat of enamel is applied

to give the ground color and is allowed from 5 to 10 min. for the volatile solvents to flash off. The enamel to give the contrasting colored spots is then sputtered on, and the combination is stoved by a single pass through the oven. Finally, a coat of varnish is applied by spray and baked. Synthetic media are usually employed, the oil modified glyptals being particularly suited. Such materials can be obtained to stove in 30 min. at 248 deg. F.

Unlimited color combinations to tone or to contrast can be selected. Dark and light gray, green and blue are the most popular, or the light shades of these colors with white sputter. Details of these enamels of typical varieties are given in Table IV. No undercoat or primer is necessitated, but, of course, magnesium alloy castings must be given an aqueous chromate pretreatment, and for maximum serviceability may be provided with the stoved zinc chromate primer.

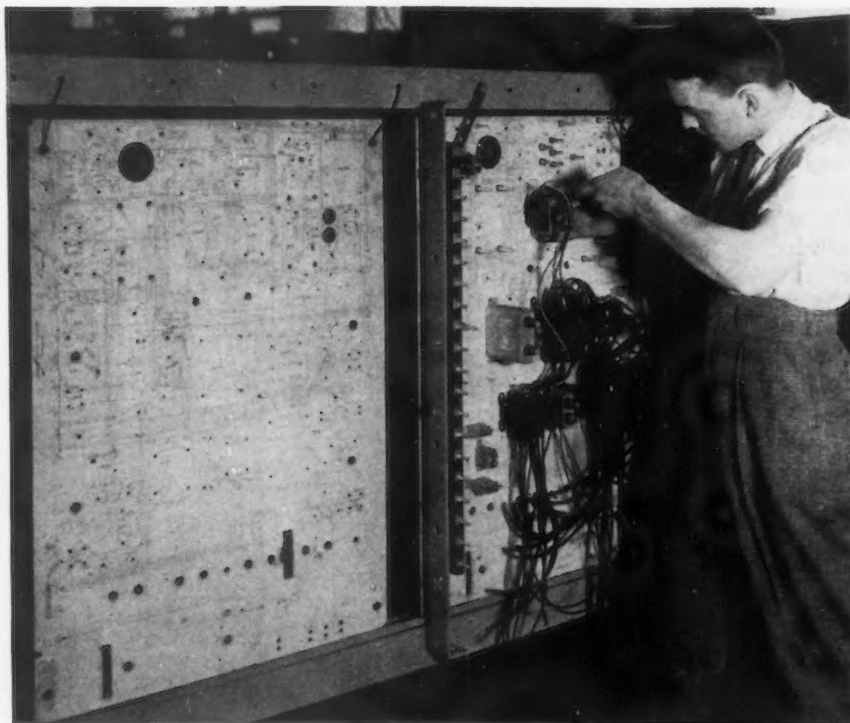
Light alloy castings all too frequently exhibit blemished surfaces due to minor sand holes, tool marks, feed or riser junctions, fettling

blemishes and other defects. Varying degrees of effort can be expended in bringing the major surfaces into a reasonable condition for finishing. The principal enamel finishes available for the masking of such superficial defects have been discussed. From these finishes can be selected those of sound durability, esthetic appeal, and economic production. The baked crystallizing and brocade enamels and the stoved sputtered finishes claim chief attention in this application. They offer flexibility in formulation to meet the severity of service entailed as well as falling within the limits of finishing cost estimated.

Assured service follows from the nature of the media employed for this class of work. Nevertheless, a warning to the effect that pretreatments for cleaning free from grease, oil and dirt, and for chromating the magnesium light alloys must not be omitted. While this article has dealt with "patterned" finishes from the angle of their particular merits for castings, their attributes render them equally serviceable on sheet or structural metal work.

Wiring Template Speeds Assembly of Control Panels

DRILLING of holes in control panels and assembly of the units is being speeded up at General Electric by the pasting of oil-resistant paper wiring templates to the back of the panel. Shown in the photograph is a workman assembling one of the many thyatron resistance welding controls being produced for the precise control of resistance welding machines in war production. To the left is a panel as it comes from the drilling operation. All the workman has to do is fasten the many parts in their respective places and connect the wires as indicated on the template. He can leave the panel temporarily and take up the assembly later without hesitation, or someone else can take over the job on a second shift. When completed, the assembly and wiring can be checked almost at a glance preparatory to test. In addition, this arrangement helps simplify the maintenance job at the plant where the welding control panel is installed.



THIS workman is assembling one of the many thyatron resistance welding controls that G.E. is putting out to speed precision control of resistance welding machines. At the left is shown a panel as it comes from the drilling operation.

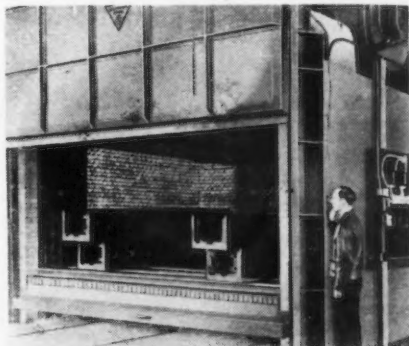
New Equipment . . .

Heat Treating and Process Control

On the following pages, new developments in the field of heat treating, temperature controls, timers, etc., are discussed.

DELAWARE TOOL STEEL CORP., Wilmington, Del., has introduced a new type of gas fired, controlled atmosphere furnace for heat treating of all types of steel. The furnace is cylindrical in shape and the flame block is so designed that as the gas emerges from the port it bursts into flame as a flat ribbon of heat which is directed around the circular wall of the combustion chamber. A baffle tile is placed between the front opening of the muffle and the door so that heat losses at the door are reduced to a minimum. The atmospheric gas is produced from the fuel gas itself. For steels heat treated at temperatures up to 1700 deg. F., a slightly oxidizing atmosphere is produced. For steel hardening above 1700 deg., a protective atmosphere containing approximately 12 per cent CO is obtained by introducing a gas-air mixture into the muffle. Measured amounts of these constituents are taken from the main gas and air lines and are controlled by manometer gages. Excess gases are ignited by the flame from the

burners over the exhaust vent. The furnace is designed for operation on low or high pressure gas and works equally well with artificial, natural or propane gas. The combustion chamber is lined with sillimanite and is serviceable at all operating temperatures up to 3300 deg. F.



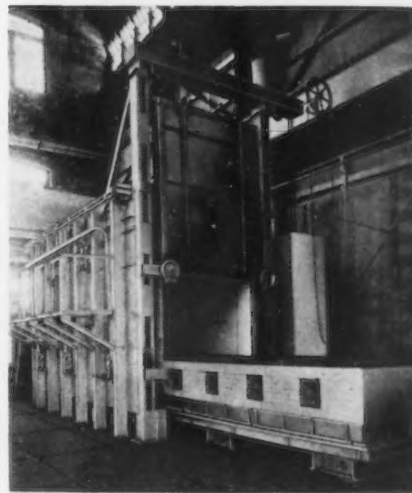
Car-Bottom Type Furnace

A NEW car bottom type stress relief furnace has been installed by *Despatch Oven Co.* of Minneapolis, with completely automatic heat control. Simple operation of a few dials provides any desired time and temperature combinations for preheating, soaking and cooling. Weldments are loaded on rugged, heavy duty, insulated cars which enter the furnace through either of the two lift doors at opposite ends of the heat chamber. One car can be loaded while the other is in the heat chamber. Car bottoms are carefully leveled when installed. Effective sealing of the work chamber to promote even interior heating is provided. The electrically operated doors form sand seals at both ends of the car. Heater, fans and circulating ducts on each installation are carefully balanced to insure close temperature control. Distributing ducts have graduated ports, adjusted with an anemometer. Automatic control equipment permits operator to follow any predetermined cycle of heat

treatment, simply by setting the dials.

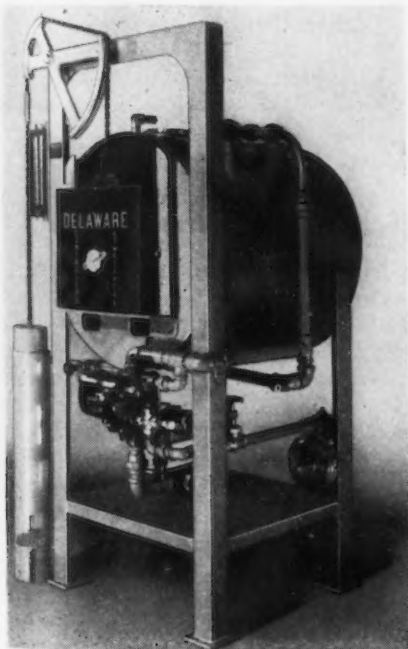
Car-Type Annealing and Normalizing Furnace

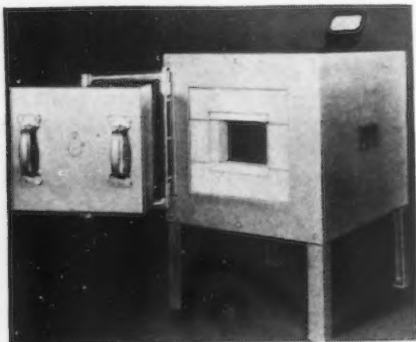
DEMPSEY INDUSTRIAL FURNACE CORP., Springfield, Mass., announces a new furnace with an arrangement for supplying heat both above and below the material. The furnace heats rapidly and produces uniform temperatures within plus or minus 15 deg. over the entire range of 1200 to 2100 deg. F. The cold center inherent in plain direct fired types of furnaces is eliminated by the use of combustion chambers built directly into the top. Upper burners, firing directly under the furnace arch, are provided in addition to the lower burners firing into the car top combustion chambers.



Electric Muffle Furnace

THE Falcon line of electric furnaces manufactured by *H. O. Swoboda, Inc.*, 13th Street, New Brighton, Pa., has been augmented by a new full muffle electric box type furnace with all-refractory hearth. The new Falcon BMW furnace is for heat treating high speed tool steels, hardening, tempering, and many other tool room

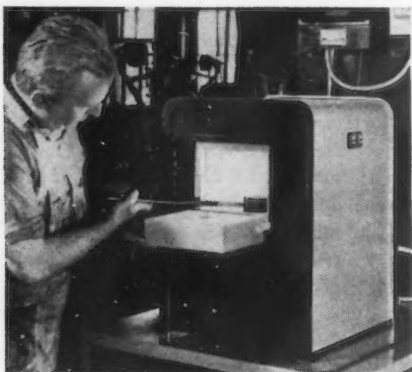




and laboratory heating applications. A new type center pivoted door always swings away from the workman thus preventing exposure to the heat of the inner door surface. The box type muffle is completely surrounded by heating elements which eliminate temperature variations in the hearth chamber. The furnace shown is arranged for bench mounting, but it is also available in floor mounting style. Capacity provided is 3 kw. and it can be furnished for 110 or 220 volts, single phase current. Automatic temperature controls are supplied.

Electric Heat Treating Furnace

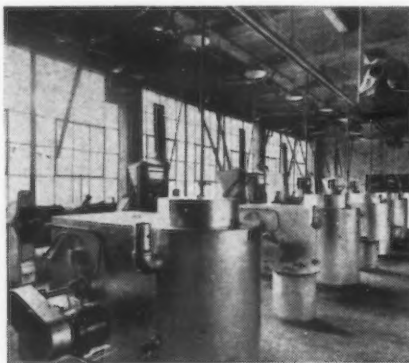
THE COOLEY ELECTRIC MFG. CORP., Indianapolis, has developed a small electric muffle furnace for economical and fast heat treating of small parts, drawing or tempering small lot small parts, normalizing or annealing small parts, preheating for subsequent high-speed hardening, and for emergency repair orders where one or two small parts must be heat treated in a short time. The furnace is offered in two sizes as follows: Type MH-3 has a chamber capacity 8 in. wide, 6 in. high by 14 in. deep, maximum power consumption 3400 watts. Type MH-4 has a chamber capacity 10 in. wide by 6 in. high by 18 in. deep, maximum power consumption 4800



watts. Operating temperatures are 1750 deg. F. for continuous operation, and 1850 deg. F. for intermittent operation. The outer shell is of heavy gage sheet steel interposed between cast iron end frames. Four interlocking rectangular elements of the embedded type form the interior of the chamber and replacement is simple.

Layout for Shell Case Annealing

THE DESPATCH OVEN CO., Minneapolis, has developed its Layout No. 1 for annealing brass shell cases. All furnaces are the same size which makes for easy interchange of furnaces and consequently reduces the danger of a bottleneck at any point. Circular blanks coated with drawing compound are brought to the drum type continuous washing machine in boxes. This machine automatically

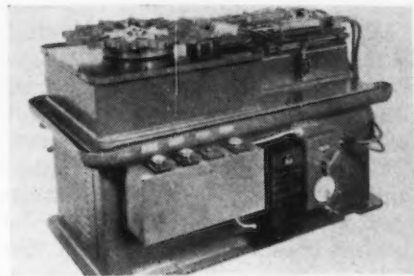


washes and rinses the blanks and loads them into a furnace basket. Upon completion of heat treatment, the basket is withdrawn from the furnace and by monorail conveyor goes to the quench. After quenching, blanks are dumped into a machine which automatically pickles, rinses, and neutralizes them. The clean blanks are returned in tote boxes to the press for cupping. After cupping, the same cycle is repeated for the first, second, third and fourth draws consecutively.

Flame Hardening Machine

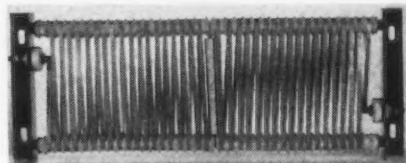
A **FLAME** hardening machine is announced by **Hydraulic Machinery, Inc.**, 10421 Grand River, Detroit. Base and external housing structures are of welded steel design. Electrical control and hydraulic power as a motive source provide positive and flexible operation. Parts that require adjustment and routine maintenance are on the outside. Pilot light, burners and water coolant are located on the rear slide. The working parts are

adequately shielded from the heat in the machine proper. Water is used as a quenching medium and it is completely sealed from the actuating mechanism. The part to be hardened is manually loaded onto the index table, the pilot positioned with a locating pin and after the start button is pushed, the machine goes through its complete cycle and stops.



Air Heater for Ovens

A **NEW** air heater for heating ovens or furnaces used in annealing of aluminum, glass and other materials has been announced by **Westinghouse Electric & Mfg. Co.**, East Pittsburgh. Designed for temperatures of from 750 to 1150 deg. F., the unit has a heating element consisting of a one piece nickel-chrome ribbon, spirally wound around heavy porcelain insulators. Rating is 5 kw. for operation on 220 volt circuits. The complete heater is only 2½ in. thick and requires a space 12 x 33 in. for mounting.



Aspirator Burner

A **PREMIXING** aspirator type gas burner with single valve control for maintaining constant air-gas ratio throughout its operating range has recently been announced by the **North American Mfg. Co.**, 2910 East 75th Street, Cleveland. The unit, including aspirator mixer, butterfly air control valve, full flow gas cock and combustion tile assembled on a flanged mounting plate, comes ready to be cemented in or bolted to the furnace wall. There is provision for either spark ignition or constant burning low pressure air and gas pilot. Fittings provide for either left or right hand connec-

tions and individual gas-air adjustments can be made or a fixed orifice installed in advance or after installation without breaking any pipe connections. Sizes provide for inputs up to 1,500,000 B.t.u.

Thermostatic Bimetal

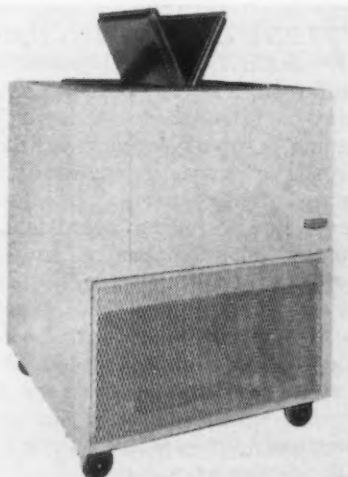
A THERMOSTATIC bimetal has been announced by the *W. M. Chace Co.*, 1600 Beard Avenue, Detroit. Through the use of new alloys, this bimetal is said to have a decidedly increased sensitivity over previous standard types. Thus, by the use of this new type, it is claimed that a reduction up to 40 per cent in weight and mass of thermostatic bimetal element is made possible. This bimetal has a temperature range of from -50 to $+600$ deg. F. and weighs 0.27 lb. per cu. in.

Vibratory Feeder for Furnaces

SYNTRON CO., 694 Lexington Avenue, Homer City, Pa., has developed a line of electric vibrating feeders for conveying metal parts and pieces onto the moving grates of continuous heat treating furnaces. These are made up of a wide flat pan of the required size having a cast stainless steel nose piece to stand the furnace heat, all vibrated by a pulsating magnet which causes the pieces to flow forward. The speed of the flow of pieces can be varied by a rheostat in the separate electric control panel furnished with each feeder. An electric clock timer in the controller provides an adjustable intermittent feed.

Industrial Sub-Zero Machine

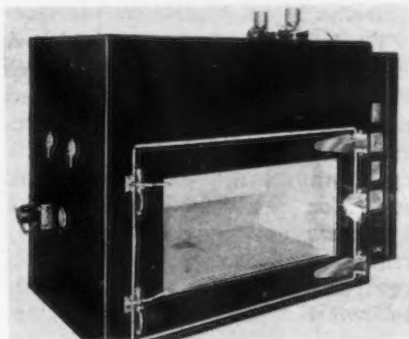
STORING aluminum rivets, preparing expansion fits, aging steel and aircraft instrument test-



ing are the principal applications of the industrial sub-zero machines built by the *Kold-Hold Mfg. Co.*, Lansing, Mich. The unit used for storing heat-treated aluminum rivets cools them to -45 deg. F. and is said to hold them to -40 deg. F. under actual working conditions. The refrigerator for aircraft instrument testing operates at temperatures as low as -75 deg. F., and has a 6-in. thick glass observation door. The company also offers stratosphere testing chambers that maintain required pressure and humidity conditions at temperatures as low as -90 deg. F. Cabinets are built in capacities of from 2 to 11 cu. ft., in four temperature ranges from -45 to -90 deg. F.

Instrument Tester

A NEW chamber for testing instruments under extremes of cold and heat has been developed by *American Coils, Inc.*, Newark, N. J. Its range of operating temperatures extends from -55 to $+70$ deg. C. and it includes apparatus for mechanical refrigerating and electrical heating. Model RTC-1, illustrated, consists of a two-stage con-



densing unit, heat exchanger, liquid sub-cooler, coil or evaporator, expansion valves, cabinet and forced draft strip heater, along with thermostats and other controls. The entire operation is controlled from a front panel board. Refrigeration is rapid, and the cabinet without production load should reach -50 deg. C. in approximately 1 hr. Observation of instruments being tested is provided by an inner door with five glasses sealed and dehydrated against passage of moisture.

Metal Chiller

MOTOR PRODUCTS CORP., North Chicago, Ill., has developed the new Deepfreeze, an extreme low temperature metal chiller. Deepfreeze is offered in two



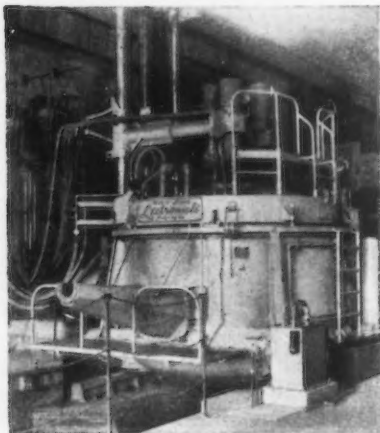
sizes: The Santocel goes down to -40 to 50 deg. and the Cascade Santocel down to -120 deg. and lower. The unit may be used for contraction of a spindle to fit to an anti-friction bearing or for shrinking steel bushings in cast iron boring fixture housings. The bearing shoulder of the shaft shown is approximately 2 in. in diameter and can be shrunk 0.001 to 0.0015 in. in 40 min. at 50 deg. below zero. The cold cylinder is portable which means it can be taken from job to job.

No-Frost Coolers

THE Niagara "No-Frost" method for providing constant temperature as low as -50 to -80 deg. F. has been developed by the *Niagara Blower Co.*, 6 East 45th Street, New York. This new equipment using Niagara No-Frost liquid gives constant operation without interruption or loss of capacity by reason of ice or frost forming on cooler coils or because of corrosion of the equipment from contact with brine or calcium. It consists of coolers operated in stages, the first stage reduces to temperature just above the freezing point of water and removes humidity; the second stage removes the balance of the moisture, and the



third stage produces and holds the required final temperature. Moisture is removed from the air below 32 deg. F. without causing formation of ice on coolers.



Electric Furnace Improvements

THE PITTSBURGH ELECTRO-MELT FURNACE CORP., 128 32nd Street, Pittsburgh, has improved the design of a number of its smaller size electric furnaces in order to handle more efficiently the peculiar type of lighter scrap now being turned in to the steel mills. Principal change is in the elongation of side plates to increase volumetric scrap capacity and maintain rated capacity of heats. In the 10-ton furnace, the side walls are deepened to allow an increase of 25 per cent in scrap capacity. Side walls, including refractory linings average 13½ in. in thickness. Furnaces are cylindrical in shape with spheroidal bottoms.

Electric Arc Furnace Control

A NEW electrode control for electric arc furnaces has been announced by **Allis-Chalmers Mfg. Co.**, Milwaukee. In it the company has applied its standard Regulex exciter which has been used for many years to control temper pass and reversing steel mills. The Regulex exciter controls arc energy to a constant quantity without the use of contact-making devices. Control field windings that measure arc current and volts are part of the fast-acting control element used in this method of electric arc furnace control. With its voltage controlled by the exciter, the small generator supplying power to the electrode motor causes the motor to raise or lower the electrode as required by uninterrupted Ward-Leonard control. The variable voltage control eliminates high voltage inrushes.

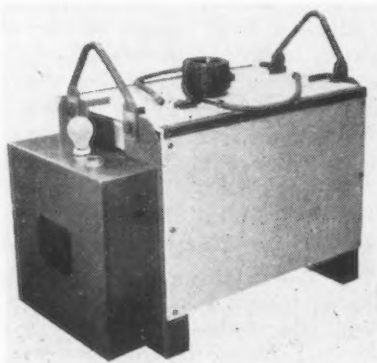
Sleeve for Hot Metal Ladles

A NEW type of sleeve for hot metal ladles has been developed by the **National Fireproofing Corp.**, 202 East Ohio St., Pittsburgh. These Natco sleeves are extruded through a die at extremely high pressure in lengths as long as practicable for handling in the making up of stopper rod assemblies in the steel mill or foundry. The use of these longer length sleeve bricks reduces the probability of rod joint failure by 50 to 70 per cent. The formation of air pockets in the clay during mining is eliminated by the de-airing process. This process produces a material of uniform density, free from laminations and faults. Hot metal ladle pouring nozzles are manufactured in the same manner as the sleeves.



Electric Metal Heater Transformer

THE AMERICAN CAR & FOUNDRY CO., 30 Church Street, New York, announces new developments in their Berwick electric transformer heaters. The 60-cycle low voltage, low temperature induction heater is built in the same way as the screen heating transformer, except that it is equipped with induction coils, able to heat Nitralloy bushings 3⅞ in. o.d., with a ¼ in. wall, 3⅞ in. long, to 400 to 500 deg. in 1 min. and 15 sec., with a 25 kva. demand. A similar transformer is being used for induction heating of a steel crankshaft in which frozen bushings are inserted. A similar transformer rated at 150 kva. is



also being used for heating axles over 7 ft. long. They are brought to a temperature of around 500 deg. prior to welding.

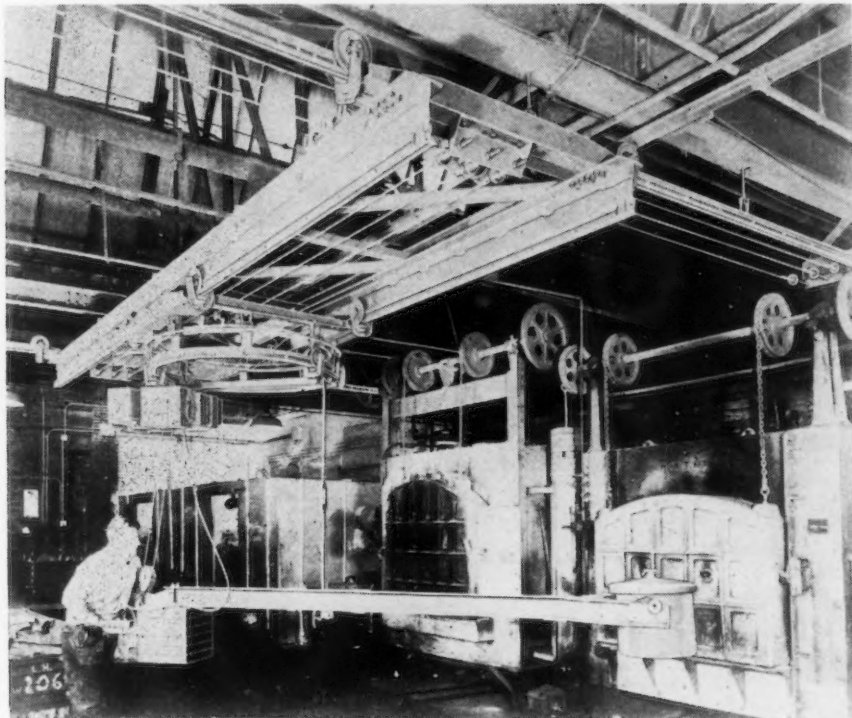
Stabilizing Control

A NEW development in the field of control engineering has been announced by the **Foxboro Co.**, Foxboro, Mass., under the name of Hyper-Reset. This is not an instrument or a mechanism, but a control function, available in the newly designed Model 30 Stabilog controller, for application where process lag is considerable. Hyper-Reset reduces the effects of a process disturbance by making initial temporary additional corrections, which are proportional to the rates of change of the measured value caused by the disturbance. The normal reset follows, establishing stabilization. But the several control functions carried out by Hyper-Reset are simultaneously and automatically adjusted. No tuning-in is necessary and no more than two process adjustments are required, proportional and Hyper-Reset.



Stop-Off Lacquer for Hardening

THE MICHIGAN CHROME & CHEMICAL CO., 6340 East Jefferson Avenue, Detroit, has recently introduced "Micro Supreme" stop-off lacquer which has proved effective in localized hardening of steel parts. By its use, the usual grinding operations required after copper plating and before heat treating are eliminated. In the simplified method a coating is applied on the areas to be hardened before they are plated. After plating, all that is necessary is to remove the lacquer and the pieces are ready for heat treatment without further preparation.



Quenching Crane

TO solve the problem of moving annealing pots from furnace to quench in the quickest possible time, the *American MonoRail Co.*, 13107 Athens Avenue, Cleveland, has introduced a new crane. One man operates the crane by hand with a $\frac{1}{2}$ -ton electric hoist to raise or lower a 900-lb. counterweight which consequently picks up or drops the 400-lb. pots. The 7 ft. arm for reaching into the furnace is mounted by porter bar on swiveling truck with hoist at the opposite end. This allows rapid swinging of load into position for quick deposit in the quenching machine. Swivel movement, as well as movement across the bridge and entire crane on runways, is by hand on trolleys provided with precision bearings.

Compensating Temperature Control

ATEMPERATURE control application designed to maintain even heat throughout a multiple-burner furnace or oven regardless of heat loss at the door or doors, and to give protection against excessive temperature in the event of thermocouple break or upon failure of control apparatus has been announced by *Wheelco Instruments Co.*, Harrison & Peoria Streets, Chicago. To replace heat lost at the doors and maintain the entire furnace at even temperature, burners are controlled so that those at

the extreme ends burn while those toward the center are out. In either continuous car or batch-type operation, the temperature control arrangement provides the exact temperature desired at all points within the furnace. Protection against instrument thermocouple or control apparatus failure is provided by a Limitrol, which shuts off fuel supply to all burners by means of a solenoid valve installed in the main gas supply line.

To conserve critical metal, the *Wheelco Instruments Co.* is furnishing steel or cast iron cases in place of aluminum cases for its control instruments, including Capacitrols, Limitrols, Thermo-rols, etc.

Fire Brick Cement

ACEMENT for use in laying insulating fire brick has been introduced by the building materials division of the *Armstrong Cork Co.*, Lancaster, Pa. Known as Armstrong's No. 2500 cement, the product is designed especially for use in laying Armstrong's A-16, A-20, and A-25 insulating fire brick. This material provides a coefficient of expansion of the dried cement virtually the same as the brick with which it is used, thereby eliminating cracking and peeling caused by differential expansion. This new cement is particularly suitable for use directly exposed to furnace temperatures over 1800 deg. F.

Aneroid Manometer

THE absence of mercury or other liquid from the Taylor aneroid manometer, manufactured by the *Taylor Instrument Co.*, Rochester, N. Y., removes the possibility of product contamination and the hazard of mercury being blown due to line surges or carelessness. Replacing the stuffing box is a new torque tube assembly which gives a completely closed system and is designed so as to eliminate friction and lubrication. The sturdy metal bellows respond rapidly to the pressure variations. Under steady flow conditions the Taylor aneroid manometer is accurate within 1 per cent of scale range. It is available for all types of indicating and re-



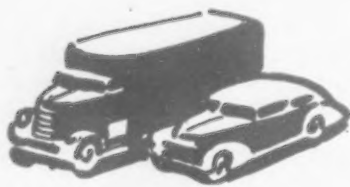
cording meters and controllers and is supplied for standard ranges between 20 and 500 in. of water. The range can be changed by substituting precalibrated torque tubes.

Vernier-Set Timers

RECENT design improvements have increased performance characteristics on the series 2800 vernier-set timers, manufactured by the *Automatic Temperature Control Co., Inc.*, 34 East Logan Street, Philadelphia. The standard built-in features of telechron motors are now augmented with a one-piece molded bakelite terminal block accommodating all external wiring to clearly marked screw post terminals, leaf-spring contact for positive make-break action. Flaminol and special flexible wiring are employed throughout. These timers are available in two types—normal clutch action for resetting upon power failure and reverse clutch action for non-resetting on power failure.

Assembly Line . . .

• **New tank-automotive ordnance center moves to reduce varieties of tank types . . . Closer tie developing between auto industry and Army Ordnance . . . Engineers propose specification changes in vehicles.**



DETROIT—Relocation and organization of the tank-automotive center of the United States Army Ordnance department has now been completed at Detroit. Several hundred officers and a complete complement of office help have been moved into the Union Guardian Building, recently taken over by the Army, and this group is functioning in charge of the entire Army ordnance program. The move is the first in a program of de-centralization and is characterized as "the boldest stroke of the sort the war has yet seen."

Brig. Gen. Alfred R. Glancy, deputy chief of ordnance, is in charge. Billions of dollars a year in contracts are supervised and will be supervised by this office, functioning as a control point for the 13 ordnance districts of the nation.

Top Army officials in this office are optimistic today over the outlook on materials, a viewpoint, it must be said, which is not generally shared by industrialists. The Army men believe that the inventory surveys being made by WPB, and the moves being developed to clear up the priorities problem, will result in a definitely improved picture during the next 90 days, inasmuch as they feel that materials problems have resulted from maldistribution more than anything else. They do anticipate, however, that the increasingly important aircraft

program may interfere with some tank output projections, due to reallocation of alloy steels.

From these same Army sources come indications that the heavy tanks, so much discussed a year ago, are unlikely to have any considerable future. So far as the heads of ordnance and of the armored forces look at the problem, the chief worth of a tank lies in its fire power and in its mobility. The heavy tanks, a few of which are being built now, are not nearly as mobile as the medium and, of course, the light tanks. Right now experiments are going forward inquiring into how much fire power can be mounted into a medium tank with safety. If the investigations establish that the caliber and weight of the artillery of the medium tanks can be made roughly equivalent or close to that which has been planned for the heavy tanks, then 60-ton land battleships appear unlikely to emerge beyond experimentation.

AT the same time, ordnance experts are intensively seeking to standardize tank types, both in the medium and light weights. At present there are several varieties of M-4 medium tanks, with the main differences in their power plants. Aircraft type, automotive type and diesel engines are all employed. The chief reason for the great variety of power plants now being used in tanks has been inability at today's production stages to obtain sufficient quantities of any one type. The various engines being used are being and will be checked most carefully as regards their combat durability, their general durability, their simplicity of maintenance, and their economy. When all the returns are in, one engine will be adopted as standard for all tanks produced by all makers. This may come within the next year.

In the managerial offices of the prime tank contractors, incidentally, opposition might be expected to a decision to eliminate all but perhaps one or two plants as tank engine manufacturers. Such, however, is not the case. There is so much work to turn out that the standardization of tank engines will be welcomed.

Moves are being made even more rapidly toward standardization of the light tanks, now in production

by several makers. It appears now that the light tank of an automotive producer has the inside track, based on its performance records to date; and the general trend of thinking is that this one unit may soon be named as the prototype for all other light tank producers to follow.

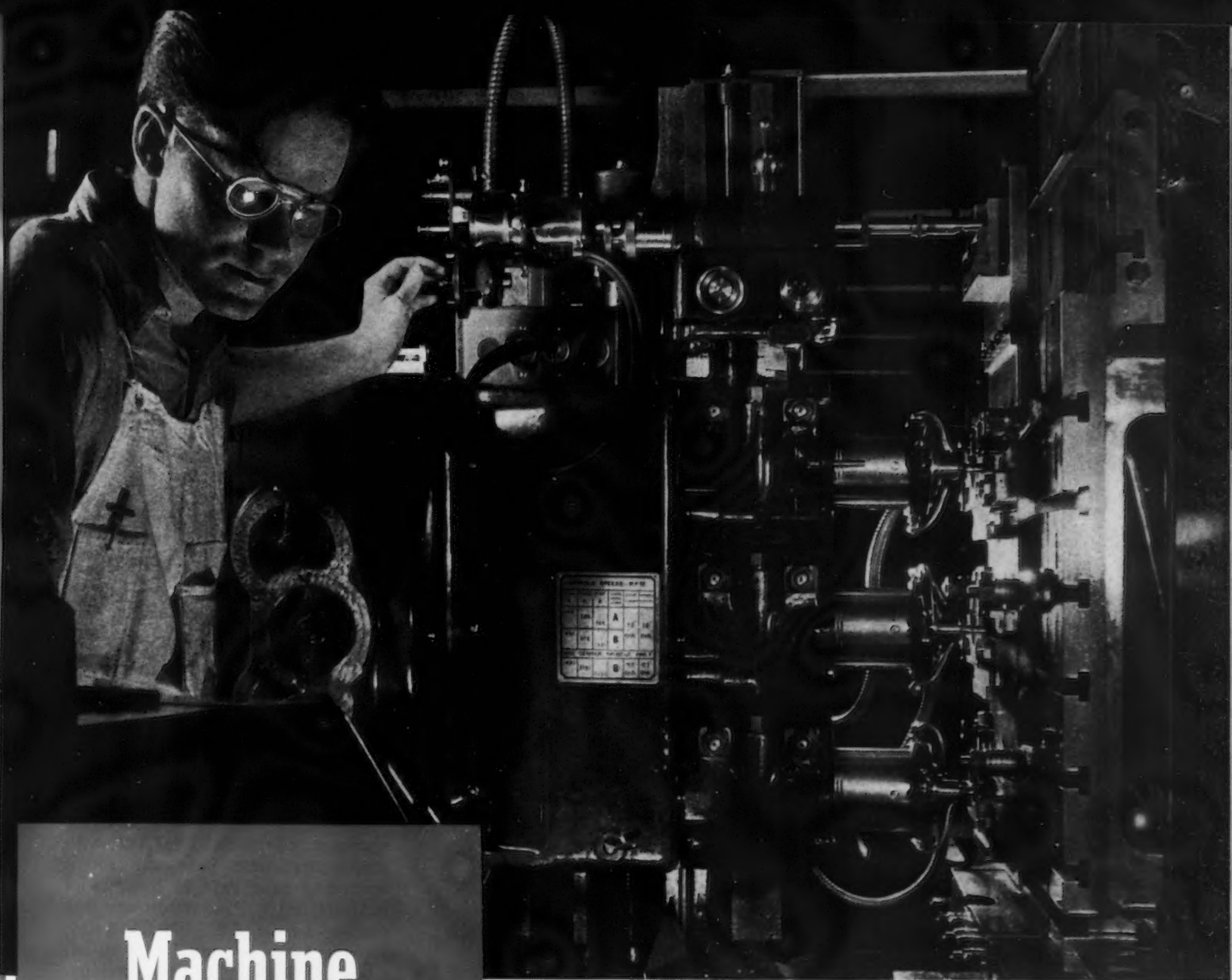
Word from the ordnance office on trucks is that the ratio of these vehicles to men in the Army will continue to be lengthened. A year ago, before we entered the war, one truck was sought for every five men scheduled for Army service. This ratio, however, is now characterized as a "peace time frill." The ratio may rise as high as one truck to 20 men, although any estimates of this sort are entirely hypothetical at this time. The ordnance people are not overly concerned today about the size of their truck commitments, and the original 1943 production schedule of 880,000 units continues to stand reduced to about 420,000, as outlined here recently.

ONE other major endeavor of the new Detroit office is the procurement of rifles. Officials in charge express themselves as pleased with the output of Garands and say that manufacturer is continuing and will continue to keep up with mobilization.

Meanwhile, last week saw a love feast take place between the ordnance people and the automotive industry which is liable to develop major ramifications during the next few weeks.

Maj.-Gen. L. H. Campbell, chief of Ordnance, came to Detroit for a speech before the Economic Club, at which he said he had heard that important things were going on at the Automotive Council for War Production. He followed this up with a visit to the ACWP headquarters, flanked by the most impressive display of brass buttons the New Center Building has yet seen. The indications were that Gen. Campbell's thinking and action along lines of cooperative enterprise in many spheres was being paralleled to a degree by the work of the auto people. Out of this circumstance could logically be expected to emerge much closer liaison between the Army and between industry, at least that segment of industry represented by the Automotive Council.

But it would not be amiss to en-



Machine with a "BRAIN" ... the Keller

RIGHT NOW, this machine is profiling anti-aircraft gun parts, three at a time. *Two years ago* it was working on agricultural implements. *The day after we've won the war* it can turn again to the products of peace . . . *without conversion, without tooling up.*

For this is the versatile Keller Machine, one of the many Pratt & Whitney products that provide *basic accuracy for mass production.* It has a mechanical-electrical "brain." Its tracer follows a master pattern . . . its cutters reproduce the pattern in two or three dimensions *precisely.* It maintains its own accuracy, does its own "thinking," demands a minimum of attention. The experience is *built in.*

There is no better-paying investment than the right tools for each job. If you need basic accuracy for mass production, call on Pratt & Whitney.



PRATT & WHITNEY

Division Niles-Bement-Pond Company
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vision an even larger sphere. Not many weeks ago the Council announced that it would make its findings available on an international basis, to British war producers. And then there are the Councils formed by Pacific and by eastern aircraft producers during recent months. Broad consolidation of all the councils, and of Army planning—perhaps spread right

that the very best materials should be specified, regardless of its availability, regardless, too, of the life expectancy of the unit. With supplies steadily tightening, the automotive industry has aimed to utilize more readily available materials and thus relieve tightness of critical types. One effort in this direction was to substitute carbon steels for alloy steels and to interchange

the power train of most vehicles. The parts subject to the most intense strains are the low gears of the transmission and the bevel gear pinions at the rear axle. These must necessarily continue to be made of tough steels. But that fact is no reason for the specifying of the same grade of steel for the other and less severely used components of gears, drive shafts and axles. Recommendations for changes in such components to lower alloy steels appear logically drawn.

Changes which are destined to be adopted will be nothing new in the arms production program. Estimates are that since January the plants of the auto industry have made about 10 times as many major and minor "model changes" as are normally made in a regular automotive year. The fine question at issue is to define a line, on one side of which changes should be made despite interruption in output advance, and on the other side of which time losses cannot be justified by any of the other factors involved.

Giving due regard to production changes, the auto industry estimates that next year will see it operating at a rate at least twice that of today. Production now has reached a level of \$17,000,000 a day, representing an annual rate in excess of \$6,000,000,000. Employment stands at 850,000 men and women, states the Automotive Council, up 230,000 from the conversion low point in February and about 100,000 higher than were ever employed before within the industry. Scratch pad figuring arrives at the conclusion that this production rate and the worker army turning it out could manufacture 7,000,000 cars and trucks annually, or about 30 per cent more than were completed in the peak volume year of 1929.

DODGE DODGER: One of the newest types of anti-aircraft vehicles is this truck being manufactured by Dodge and now under test in Army maneuvers in the Southwest. This truck mounts a 37 mm. gun behind an armor plate shield. It is a low silhouette, 3/4-ton carrier with a top speed in excess of 50 m.p.h. over rough terrain.



across the Atlantic—may lie in the cards to be dealt soon. Those anticipations, however, are a bit farther afield than the more concrete developments in formative stage today.

AT the same time, engineering offices of automotive companies are themselves pleased with an attitude of increasing cooperation which they have sighted in the Army in recent weeks. Particularly is this said to be true with respect to the substitution of steels and other materials for grades originally specified.

Most of the tanks and trucks now in production, as example, went through development stages in the peace years when problems of scarcity were hardly considered possible. Even vehicles which have undergone development since we entered the war have been burdened with a carry-over of the thesis

alloy steels of greater availability for those of less availability. However, such proposals, until recently, met no favor in the Ordnance Department, and the result was said to be a rate of production below that which otherwise might have been achieved.

Now, however, substitution technique is more warmly welcomed. Perhaps the best example of this is that the Ordnance Department has received, and with relish, a detailed series of proposals during the past fortnight developed by automotive engineers, recommending changes in specifications for the materials of scores of major parts of one specific vehicle. Similar surveys will follow at regular intervals and the general expectation is that the bulk of these will be acted upon favorably.

Most of such changes are based on a common-sense approach to the problems. For instance, consider

Bethlehem Relines, Enlarges Blast Furnace in 21 Days

• • • The Johnstown plant of the Bethlehem Steel Co. on Oct. 22 completed the relining and enlargement of a 1200 ton capacity blast furnace, 21 days after the last iron was tapped from it. Normally 60 days would be required. As a result, the furnace will produce approximately 45,000 tons of pig iron 40 days ahead of schedule. This is enough pig iron to make 90 destroyers.



Photo by U. S. Army Signal Corps

Do you want **YOUR** boy to be short of equipment?



When he is called upon to go into action against the enemy, do you want him handicapped by lack of proper fighting equipment...all because the rest of us back home failed to supply *enough scrap* to keep the steel mills running full speed?

There is no fooling about this scrap shortage. It's really serious! And it must be corrected speedily by a whole-hearted, determined job on the part of every man in industry. We *must* find that much-needed scrap and *turn it in!*

It's not only our *job*...it's our moral *responsibility*...

to turn in every pound of metal that is not actually at work in our plants! The men on the battle front *need* the worn-out machines, old gears, obsolete tools—all the junk metal in *your* plant. They need it **NOW!**

Place a responsible executive in charge of your salvage program. Put properly marked boxes throughout the plant.

Even old screws, nuts and bolts can soon be converted into bullets and guns to back up the boys who are doing the shooting at the front.

Dig out *your* scrap! Get *in* the scrap to lick the Axis!

THE *Carpenter* STEEL COMPANY, READING, PA.

Washington . . .

• Taxpayers will have difficulty becoming accustomed to sharply higher rates in 1942 Revenue Act which is candy coated for business . . . Firms with heavy debt load given chance to reduce funded indebtedness.



WASHINGTON — Though nearly one third of the national income in 1942 will go toward defraying the cost of government and of conducting the war, protests against the steeper taxes provided by the 1942 Revenue Act signed by President Roosevelt on Oct. 21 have not been as voluble as might be expected. The reaction is explained by reason of the fact that individuals and business men are convinced that stern measures must be taken to insure the winning of the war.

As usual with new tax legislation, its subjects will have a difficult time becoming accustomed to the idea of the higher levies and the practical difficulties of operating at greatly reduced compensation. What the impact of the tax law on prices, wages, interest and profits is can be demonstrated only by time.

Corporations were hard hit with normal income taxes raised to 40 per cent, with excess profits taxes boosted to a flat 90 per cent and surtaxes hiked on a graduated scale. How many companies will have to apply for Federal loans or go to the wall as a result of the new taxes is problematical.

The candy coating of the taxes which affect business has been made attractive. Aimed at doing away with hardships and inequities, a new group of provisions has been enacted to change refund laws to the taxpayers' benefit and to re-

lax amortization, depletion, inventory and net loss statutes. Advantages to accrue from some of the new code sections have been made most alluring. Foremost among these are the provisions entitling taxpayers to recover in the future taxes paid in 1942 and the permission which has been granted to increase excess profit credit or decrease excess profits net income.

THIS \$9,700,000,000 tax bill, the heaviest in the world's history, gives corporations which have a heavy debt load an opportunity to reduce their funded indebtedness without a prohibitive tax penalty as in the past. Corporations are now permitted to purchase their own bonds for less than the issue price, and not be taxed on the resultant saving. Previously, proof was required that corporations were in unsound financial condition. The law still requires that the basis of certain of the corporation assets be decreased by the difference between the issue price and the repurchase price.

Custodial fees, advisory service charges, trustee's commissions, safe deposit box rentals, accountants fees and office expenses incurred by investors in the production of income or in the management, conservation or maintenance of property are now deductible from 1942 taxes. Since the provision is retroactive, refunds may be claimed for 1939, 1940 and 1941.

Amortization deduction privileges are granted on war facilities built or acquired after Dec. 31, 1939, and before June 11, 1940, by a corporation, retroactive to Oct. 8, 1940. Election to take the amortization deduction must be made within six months after the enactment of the Revenue Act of 1942. The claim for refund is applicable to the tax years after October, 1940.

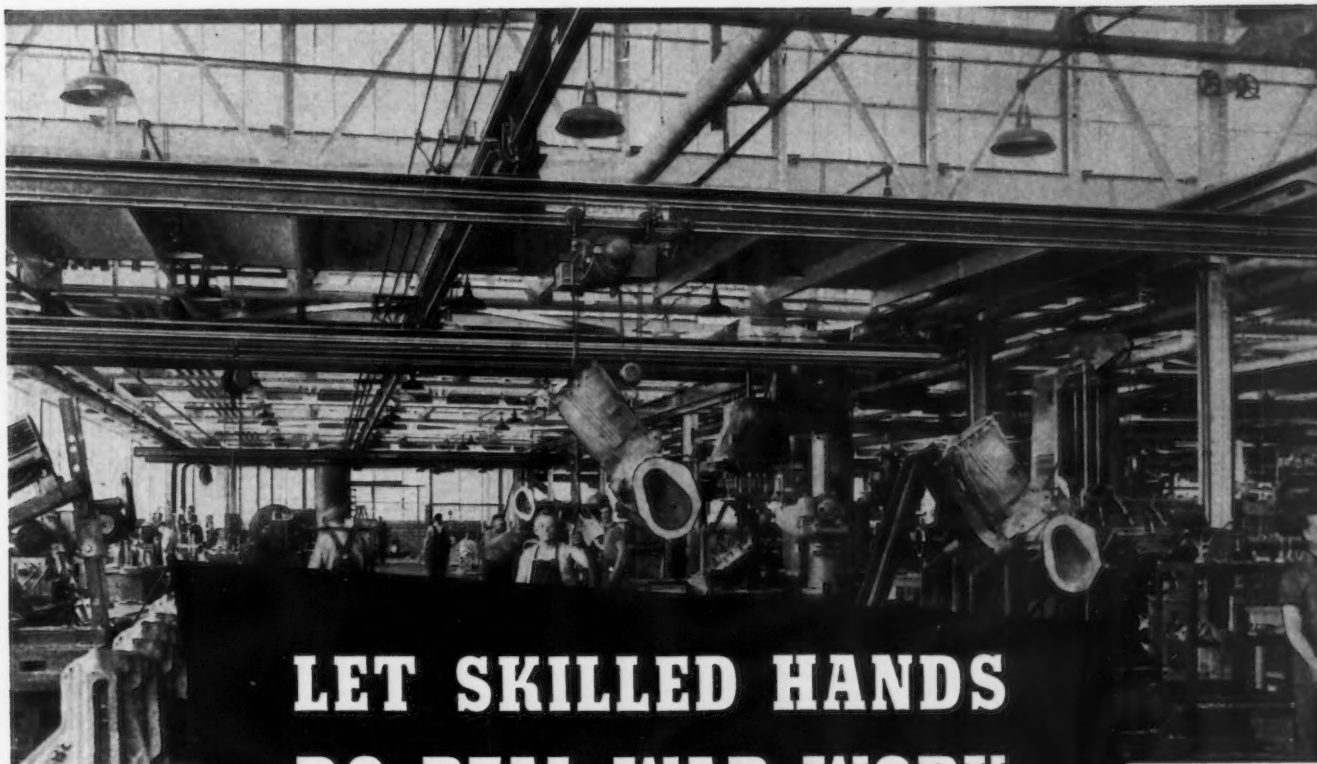
FURTHER relief is provided in that interim financial statements need not be based on last in-first out inventory method. Another method may be used in financial reports to stockholders rendered before the close of the year or for credit purposes, without forfeiting the right to use such method for



Harris & Ewing Photo

AIR-MINDED HIGGINS: Andrew J. Higgins, of Louisiana shipyard fame, is shown emerging visibly encouraged after a 40 minute conference with President Roosevelt regarding his building of super-cargo planes. The conference centered around use of his nearly completed shipyards for the construction of these planes. Higgins stated that he would never again consider building "slow ships" (referring to Liberty ships) even though the President were to ask him.

tax purposes. The annual report is still subject to this requirement. An inflationary hedge has been made possible for last in-first out inventory taxpayers where base stock is depleted. Normally, lower price stocks purchased in 1938-40 would not enter into the cost of goods sold for income tax purposes. However, under present conditions many base stock inventories are being depleted and cannot be replaced because of shortages. The liquidation of the low cost inventory is said to sub-



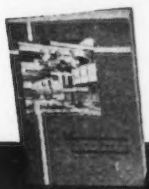
LET SKILLED HANDS DO REAL WAR WORK

Long span cranes serve machine operations on heavy castings.

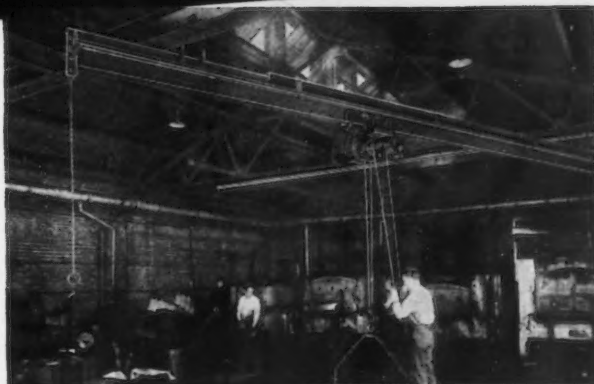
★ Too much lifting and carrying of heavy loads means "too little" production and "too late" delivery.

American MonoRail Overhead Handling Equipment will eliminate delays in your production — from unloading raw materials to loading your finished products. In every operation where handling is involved, American MonoRail Engineers have been able to speed up production by eliminating delays, relieving skilled labor from lifting and carrying, reducing accidents, conserving energy and increasing efficiency.

American MonoRail Systems are playing a vital part in speeding up production in hundreds of plants engaged in war work. Supplied for manual, electric or automatic operation. There is no interruption during installation. Call in an American MonoRail Engineer — he will show you how it can be done in your plant.



WRITE FOR Blue Book
illustrating hundreds of
MonoRail installations.



Special crane swivels on one end — telescopes on other to serve 4 furnaces.



Simple MonoRail loop provides quick handling through heat treat operations.

THE AMERICAN MONORAIL CO.

13103 ATHENS AVENUE



CLEVELAND, OHIO

ject the taxpayer to a tax not contemplated in the enactment of the last in-first out inventory provision. An adjustment is allowed in the tax for the prior year of liquidation if the depleted goods are replaced within three years after the war. The adjustment is based upon the difference between the original inventory figure and the replacement cost.

The new tax recovery section, which pertains to corporations, permits the carry-back (retroactive application) of unused excess profits credit. If a company does a large business one year and the next, because of material shortages or priority regulation, has a low income, it may carry-back the unused excess profits credit of the lean year for the payment of the prior year tax or refund. This would be possible where the excess profits credit is greater than the excess profits net income. The old law permitted the carrying forward of excess profit credits only.

EXCESS profit credit may be increased and excess profits net income decreased by doing away with the necessity of double computation and the use of both income and invested capital methods by the

correction of a low base period year, where deficits existed, or to show that the excess profits tax is excessive and discriminatory because earnings during a base period are not a fair measure of normal earnings.

The elimination of double computation of credits is retroactive to prior tax years. If a taxpayer in a prior year disclaimed the use of one of the methods and later discovers that the election of the other would have resulted in a lower tax, recomputation is allowable and refund may be claimed.

Under the income credit method, the average for the entire base period can be increased where there is a deficit for one year, or the excess profits net income for one year of the base period was less than 75 per cent of the average for the other base period years. For such deficit or low income year there can be substituted an amount equal to 75 per cent of the average excess profits net income for the other base period years.

To obtain a reconstructed average base period, the taxpayer must show that the excess profits tax is discriminatory in that it was based on abnormal base period earnings caused by fire, flood, depression or

that the base period of the particular industry does not correspond to the general industrial profit cycle, or that the taxpayer changes his business or started a new one immediately prior to the tax period. Changes may include change in management, products or services or productive capacity, or any other factor which resulted in an inadequate standard of normal earnings. Such relief is available even though the corporations excess profits tax is computed on the invested capital method. The new relief provisions are retroactive to prior excess profits taxable years.

The use of the invested capital method in computing in the case of a corporation commencing business after Jan. 1, 1940, entitles the corporation to relief if the amount of its invested capital is inadequate to determine normal profit due to good will being excluded from invested capital, the business is of a type not requiring large capital. The corporation in such case might also show that invested capital is abnormally low.

New War Plant Contracts Placed

Washington

•••The Defense Plant Corp., RFC subsidiary, has authorized the following contracts:

Ohio Steel Foundry Co., Lima, Ohio, to provide additional equipment in a plant in Ohio, at a cost in excess of \$1,000,000, making a total commitment of more than \$5,500,000.

Chrysler Corp., Detroit, for equipment to be placed in a plant in Michigan at a cost in excess of \$4,000,000.

Michigan Light Alloys Corp., Chicago, for machinery and equipment to be placed in a plant in Michigan at a cost in excess of \$800,000.

Automatic Winding Co., Inc., East Newark, N. J., to provide for equipment to be placed in a plant in New Jersey, at a cost in excess of \$200,000.

Sylvania Electric Products, Inc., Emporium, Pa., to provide machinery and equipment to be placed in a plant in Massachusetts, at a cost in excess of \$150,000.

Carworth Farms, Inc., New York, to provide plant facilities in New York at a cost in excess of \$75,000.

THE BULL OF THE WOODS

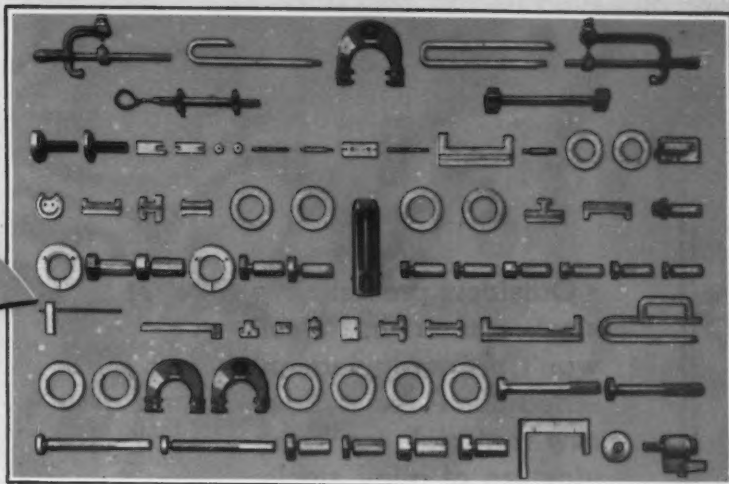
BY J. R. WILLIAMS





YOU CAN INSPECT PROJECTILES AND SHELL CASES THIS WAY

Checking each dimension separately and laboriously with its own fixed size gage requires many inspectors and lots of time. This set of gages was used in checking the critical dimensions of a 75 mm. shrapnel body.



But

HERE'S A BETTER And A FASTER METHOD

This Multichek gage checks both tolerance limits on eight critical shell dimensions simultaneously—at just one pass and far more accurately than with fixed size gages.



In just one operation this gage checks the overall length of a cartridge case, two body diameters, one flange diameter, one shoulder height, one flange thickness, one counterbore diameter, one counterbore depth, and the primer hole diameter.



Write for a Descriptive Bulletin on the SHEFFIELD MULTICHEK GAGE

**THE SHEFFIELD
CORPORATION**

DAYTON, OHIO, U. S. A.



WEST COAST . . .

• Outsiders predict new steel plants in West won't be producing on schedule . . . Kaiser has raw materials for manufacture of alloy steels . . . War contracts show increase.



SAN FRANCISCO—Wagers are being offered freely by bettors in the bridge-jumping category that neither the Kaiser Co. Inc. steel mill at Fontana, Calif., nor the Utah Geneva Works being constructed by Columbia Steel Co., United States Steel Co. subsidiary for Defense Plant Corp. will be complete and producing steel on schedule. Representatives of the corporations are not publicly receding from their original announcement of dates on which production would start, but current comment definitely soft pedals mention of the dates so confidently proclaimed when these plants were in the blueprint stage. Casual inspection of both construction operations seems to bear out the theory that construction schedules, like most western trains, are not in complete accord with the printed time table.

Difficulty at the Kaiser plant is partly attributable to the ebullient optimism with which the project was launched and the subsequent failure to clip the wings of time by getting enough salt on the tail of that fast flying bird. Publicity to the effect that construction was hindered by the War Production Board and that priorities were restricted to a greater extent than for other steel plant construction is completely false. For once, the justly famed Kaiser staff of expeditors found that the key to immediate delivery did not lie in merely getting by the front office. They were stumped by the multitude of

items for which immediate delivery was demanded.

At Provo, both Columbia Steel and Defense Plant Corp. officials discovered that the battle of man versus the wilderness cannot yet be won apparently with anything less than complete accord on matters of military logistics. Last week, over 100 families were living in tents in the desert girdled region of Provo, shivering at night and battling flies in the daytime.

Indications from Washington, D. C., that approval is imminent of a \$27,000,000 expansion of facilities previously approved for the Kaiser Fontana mill are not surprising nor will anyone fall off his seat here if the country's most persuasive borrower succeeds in tapping Uncle Sam's billfold for still another \$52,000,000 which he admittedly is requesting. As originally approved, finishing facilities consisted only of a plate mill which, although catering to an imperative wartime appetite of this region, fails by far to satiate present demand for other products, particularly structural shapes, and makes no pretense of constituting a balanced, long term operation. The entire plant is laid out with one eye on probable substantial expansion including additional blast furnaces, raw steel facilities and a wider range of finished products. As additions are made, they will fit neatly into the general layout providing integration in fact as well as theory. Like the Geneva Works, the Fontana plant, when completed, will be unique in that its final form was visualized before the first foundations were laid.

IF and when approval comes for manufacturing of alloy steels at Fontana, Kaiser will not be lacking in raw material. Already he is in the ferro-alloy business to the extent that he produces his own ferro-silicon for his San Joaquin Valley magnesium plant. Heretofore overlooked in Kaiser biographies is an early predilection for mining enterprise, and few realize that one of country's leading geologists was hired long before Kaiser gained national fame to seek out favorable mining ventures. Currently, the Kaiser staff includes mining engineers who have traveled in various parts of the West showing interest in such varied types of

properties as chrome, tungsten, manganese and copper. Just where the latter fits into the picture is not clear. At least one tungsten property is popularly conceded to be on the roster of Kaiser holdings. Already, approximately 5,000 tons of 45 per cent manganese ore are stockpiled at Fontana, representing the only raw material presently on hand there. Exploration is being conducted on the Pike's Peak, Arizona, deposit of manganiferous ore, reported to run approximately 30 per cent metallic iron and 3 per cent metallic manganese with a view to possible use for a portion of the charge at Fontana.

While all other emphasis was on expansion of Far Western production facilities, Columbia Steel announced complete discontinuance of operation of its small, outmoded tin mill at Pittsburgh, California, due to WPB directives cutting tin plate production to an extent where maintenance of satisfactory work schedules would be impractical. With construction of electrolytic tin plate production facilities at other Steel Corporation plants, the days of the Pittsburgh operation became numbered. Chief significance in its closing lies in the fact that no tin plate now is produced on the West Coast, although in normal times that item is high on the consumption list.

FULFILLING potentialities outlined before the war started, the San Francisco Army Ordnance District, which includes nine western states, has let a total of \$450,000,000 in contracts with 400 prime contractors and principal sub-contractors. Although this district is actually the smallest of 13 into which the United States is divided, products range from tanks, manufactured in the Pacific Northwest, to cartridge cases ranging from 75 mm. to 105 mm., shells from 20 mm. to 37 mm., and include a large capacity devoted to fuses, and flares and powder.

In 1939, when a few educational orders were placed with Pacific Coast manufacturers, personnel of the district was four. When war was declared, about 200 were employed. Now, approximately 1500 are engaged in administering contracts, inspecting, engineering, and keeping the wheels turning.

Contracts are clustered in Pacific



Gadget of DESTINY

With wheels everywhere about us, it is difficult to realize that there was a time when there were no wheels. Yet this device, so common now, had to be *invented*—deliberately created—for nowhere in nature is there a counterpart of the axle principle. Although the wheel comes to us out of the dim ages of unrecorded history, savages of our own time still drag or carry their burdens without its aid.

The wheels upon which, or through which, modern civilization moves are no longer mere bearers of burdens. We have learned to make wheels transmit and deliver power; indeed the wheel has made it practical to *create* power by means of engines. To control power in the form of rotary motion still other forms of wheels are used—*clutches* to connect and disconnect driving units at will, to permit the smooth and gradual pickup of loads. Industrial clutches play a major role in our modern world.

For nearly a quarter of a century, the Twin Disc Clutch Company has specialized in the development and manufacture of these tremendously important power links. Vast sums have been spent in experiment and research, two extensive plants have been built and equipped with precision machinery, engineers have traveled far and wide for field performance data—all that Twin Disc Clutches may do their jobs better, and longer, at less cost.

If you buy or build equipment depending for satisfactory service upon some form of clutch, you can make these benefits your own by specifying Twin Disc. TWIN DISC CLUTCH COMPANY, 1402 Racine Street, Racine, Wisconsin.



Twin Disc Hydraulic Torque Converters ★ bring new economy and improved performance to direct-driven diesel-powered rail cars. This is one of the latest developments in present-day railroading.



Coast industrial areas without primary regard for strategic locations, mostly within shooting distance of Los Angeles, San Francisco and Seattle-Tacoma. The Portland area has some contracts, but they are sparse in Nevada, Arizona and Montana.

In actual ordnance production, this district lags approximately six months behind sections of the coun-

try. District officers are cognizant of difficulties under which Coast industry operates and have proved resourceful expeditors.

PAUL R. PORTER, personable presiding officer of the War Labor Board Aircraft Wage hearing which adjourned in Los Angeles last week, now is masticating what he terms "one of the finest

were behind closed doors, labor representatives let it be known that the program offered by Boeing differed widely from that proposed by other Pacific Coast manufacturers. They reported that E. R. Perry, assistant to the president of Boeing, proposed that the Seattle firm boost its minimum wage to 95c per hour, with top pay at \$1.50. This approximated the scale requested by CIO representatives who suggested a 95c minimum and \$1.60 maximum to apply at all nine plants. Boeing, operating in an extremely critical labor area, proposed the wage increase with the suggestion that it was necessary to counteract a labor turnover of nearly 95 per cent in the past nine months. The eight southern California manufacturers, however, were reportedly dubious as to whether "wages . . . control labor turnover and manpower supply."

The general management proposal, it is understood, centered on a job classification and devaluation program in which wage rates would be adjusted for more than 114 different types of work. The southern California spokesmen for management regarded Boeing's case as a special problem, although the southern California plants have been plagued with an astronomical labor turnover. To justify a blanket wage increase, the War Labor Board must reconcile its action with the executive anti-inflation order which smiled on increases only where gross inequities or substandard wages are in effect, or where increases would further the war effort. Management recognized the possibility of inequalities within separate plants and within the industry as a whole, but Boeing directly acknowledged that an increase would be in line with the presidential order, it was reported.

CALIFORNIA STEEL: This is the new blast furnace and hot blast stoves at the new \$50-million steel plant being built by Henry J. Kaiser (the ship building genius) near Fontana, Cal. It is the first completely new steel plant in the war construction program and is expected to go into operation about Jan. 1. Since this photo was made WPB has granted Kaiser an additional \$26-million expansion which adds two open hearths, a structural rolling mill, a merchant bar mill and larger alloy steel facilities.

Press Assoc. Inc. Photo



try which were highly industrialized before the war began. Naturally, first contracts let went to central industrial areas in other parts of the country where facilities were ready made or easily converted, and Coast shops, at the end of the line geographically and industrially, had to wait for their share. Some facilities, not yet in full production, still are experiencing labor and materials difficulties. Contracts still are being let, although not as rapidly as when the program first gained momentum. Ordnance dis-

records ever submitted to the War Labor Board" prior to submitting his findings to the complete board in Washington, D. C. A formal hearing, which will finally determine wage scales at nine Pacific Coast airframe plants, will commence in Washington about Dec. 1.

Porter escaped from the Los Angeles hearing without graying or dropping any of his rapidly thinning locks largely through his pyretic ability to counteract the rising fever of participants in the hearing. Although all hearings

48,421,605 Gross Tons of Ore At Furnaces and Docks *Buffalo*

••• A record peak of 48,421,605 gross tons of iron ore, enough to keep blast furnaces in operation six months at the current rate, has been piled up at furnaces and Lake Erie docks, according to a report of the Lake Superior Iron Ore Association. This compares with 43,236,172 tons in September and 40,770,029 tons a year ago.



HIGHER PRODUCTION RATES...from machines having **VICKERS** HYDROMOTIVE CONTROLS

Higher production rates . . . greater operating reliability . . . less maintenance . . . simpler operation . . . have been the experience of many manufacturers using a wide variety of machines equipped with Vickers Hydromotive Controls.

Completely automatic operating cycles are easily obtainable with Vickers Hydraulic Equipment . . . machining operations are infinitely and instantly (during cycle) variable by simply turning a dial. The machine with Vickers Hydromotive Con-

trols has positive and automatic overload protection . . . exact load limitations can be predetermined and accurately maintained. Operation controls are so interlocked that neither the work nor the machine can be damaged by the inexperienced or careless operator. Spoiled work or damaged machines is production lost.

You will find it advantageous to discuss possible improvement of machine controls with Vickers Application Engineers.

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Representative of
More than 5000 Standardized
VICKERS UNITS
for every Hydraulic Power and
Control Function

Fatigue Cracks

BY A. H. DIX

Pollyanna at the Typewriter

• • • Eric Hodgins, editorial vice president of Time, Inc., says:

The war has so far taught the cynics of journalism one dangerous fact—that optimistic news, no matter how unjustified, sells better on the newsstands than the truth, if the truth is pessimistic.

Equally dangerous, we believe, is some general magazines' practice of deifying political, economic, and military leaders. The job is usually done in full oils, by expert deificists wearing rose-colored glasses, working with palettes innocent of grays, and deliberately blind to seams, blisters, checks, and a clay foot or two.

The least of the qualities granted to the subject of the eulogy is infallibility. This is bad on two counts. It leads the public to expect a batting average of 1.000, and to be disappointed with anything less. But worse than that, the subject may take the panegyric seriously, and develop a morbid horror of taking a swing at the ball, and missing. This causes him to dally overlong with his decisions. Timing is destroyed. The right move, long delayed, becomes the wrong move, like getting your wrists into a golf shot after the ball has been struck.

So long as sweetness and light, whether justified or not, continue to sell circulation we may expect to see public figures blown up to superman proportions in print, with resultant public dismay when it is found that the chest measure is only 37. The Office of War Information should see to it either that the eulogies are withheld from the eulogee, or that he is informed that the eulogizer was working to a surefire formula prescribed by his boss and that what he wrote is not to be taken full strength.

Praise be, your favorite family journal is strictly a working tool, and in it unwarranted praise or optimism would be as out of place as nickel plate on a sash-weight. The members of the brains department are under no compulsion to develop their Pollyanna tendencies, and, as you have noticed, they will strike a minor chord just as joyously, when the score calls for it, as when truth demands a major.

Slacks-Baiter



• • • Miss Mary W. Clark, of the joyless borough of Brooklyn, seeks to relieve her gloom by inveighing, in a letter to the *New York Times*, against women wearing slacks. The Bible, she says, is against women wearing the bifurcated garment, and quotes Deuteronomy xxii, 5: "The woman shall not wear that which pertaineth unto a man. . . ."

Miss Clark errs if she believes that pants and dresses were assigned eternally to men and women respectively. Look at Daniel wearing his chiton in the Armeo ad. At that time everyone wore a gown. Look at the Scotch and at Greek soldiers. Trousers are a latter-day invention, there has always been a sartorial swapping between the sexes, and Miss Clark should have thought twice before advocating a freeze.

Code-Conscious Canadian

• • • Will you please ask your naval expert, Chet Ober, to explain the use of two "E" flags in the second hoist (page 74, Oct. 1 issue) instead of the Repeater pennant, as provided in the new International Code.

Chester B. Hamilton, Jr., President
Hamilton Gear & Machine Co., Toronto

Naval expert Ober says the repeater pennant (now called the "substitute" pennant) should have been used

instead of the second E flag in "WEEK." "WEEK" is thus displayed: W flag, E flag, second substitute pennant, K flag, and is read by the receiving ship, "William, easy, easy, king."

Some years ago the Navy revamped the given names of the code flags. "A" flag used to be called "Able." Now it is "Affirm," which we believe is a change for the worse. "V" was the "Vice" flag. That was changed to "Victor," probably for good reason. "Nan" for N was changed to "Negat." This left inferior sex with no representation in the code, but that was remedied by changing the name of the Q flag from "Quack" to "Queen."

Huddle Up a Little Closer

• • • A source of continual wonderment to us is the gregariousness of American business. Immediately a field develops more than two establishments a new association is born. We are now about halfway through the Department of Commerce's new Directory of Trade Associations, a 323-page monument to the herd instinct, and have already mined these gems:

American Dog Feed Institute
Association of Coupon Book Manufacturers
Butter Tub Manufacturers Council
Candle Manufacturers Assn.
Cultivated Mushroom Institute
Curry Comb Institute
Cut Card Assn.
Hair Cloth Mfrs. Assn.
Heel Lumber Producers Assn.
Lime Putty Products Assn.
Marshmallow Mfrs. Assn.
National Kraut Packers Assn.
National Potato Chip Institute
National Sausage Casing Dealers Assn.

We would like to know what the League of Nations Assn. talks about at its meetings these days, and if the Leisure League of America is afraid of meeting Man Power Administrator Paul McNutt's baleful eye.

Metal Torso Molders

• • • For the benefit of this decade's Mark Sullivan in tracing the feminization of industry we would like to put these two facts in the record:

Your Southern California seismograph, R. Raymond Kay, saw this help wanted adv. in a Los Angeles paper:

Maid Wanted—Will pay Lockheed wages

And L. R. Mock, of Moberly, Mo., sends us a photograph clipped from the *Kansas City Star* showing crane members that collapsed in a Kaiser shipyard when a 175-ton prefabricated deckhouse was being lowered onto a ship. The caption writer, influenced by the women in industry angle, wrote:

Two steel girdles buckled under the weight of the deckhouse.

Byers Aspirin

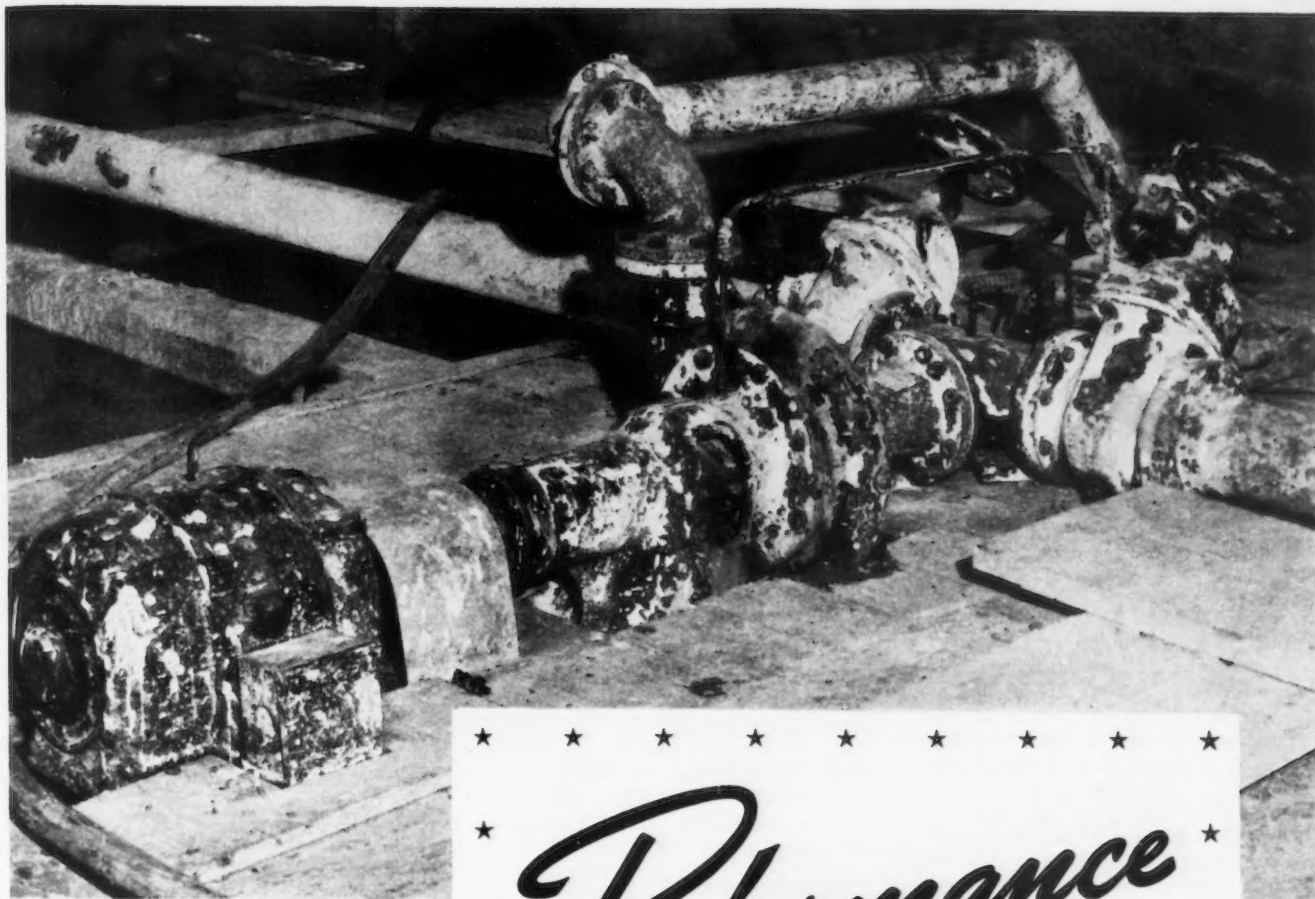
• • • Your item about the WPB filing the Cincinnati Milling Machine Co. report in the food division reminds me of the authentic instance of an investor—a Pittsburgher at that—buying A. M. Byers Co. (wrought iron pipe), thinking he was taking a position in Bayer's Aspirin.
A.W.M.

Puzzles

• • • Last week's quart can uses the smallest amount of tinplate if it is 4.189-in. high and 4.189-in. in dia. R. L. Farabaugh, of the Barium Stainless Steel Corp., says you can put four coins in two rows with three in each row. We would like to know how.

Lt. Com. A. R. Simpson wonders if any of the master minds can solve this:

A dog sights a rabbit one mile directly south of his position at the moment. The rabbit continues on a course due east, at a speed of 30 m.p.h. At the instant of sighting, the dog starts and continues chasing the rabbit on such courses that his line of travel is always directly toward the rabbit. The dog runs at a speed of 45 m.p.h. How long from time of sighting rabbit will the dog require to overtake him?



★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Performance

SPEAKS THE
FINAL WORD IN TIMES
LIKE THESE!

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

THE picture isn't pretty . . . but the performance is magnificent! Pumping raw bone gelatin stock is just about as tough a pumping job as there is. That is why the Atlantic Gelatin Company, when ordering this Fairbanks-Morse Pump and Splashproof Motor Unit specified that the unit had to make good — or else!

It did. Two months after installation, the Atlantic Gelatin Company ordered another unit just like it. Three years later it had a *three-year record of perform-*

ance without any time out for repairs!

That kind of performance is never the result of luck or circumstance. It is *built in at the factory.*

Use your priority to get Fairbanks-Morse Pumps for your war production job. Because of mechanical superiority, they retain their efficiency after less highly engineered pumps begin to waste power. Buy for today's job — yes — but with an eye for tomorrow, too. Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago.

FAIRBANKS-MORSE



**PUMPS
DIESELS
MOTORS
SCALES**

Dear Editor:

DETROIT'S ANGRY WOMAN

Sir:

I'd like to comment on your swell editorial "How To Lose The War" in the Sept. 24 issue.

Your closing line "I would hate to have these boys see what I see from my window" is amen'd by me. Up until last Monday I worked in a defense plant (evenings)—ran my office from 9 A. M. until 2 P. M., knocked out 7 columns (per month), assisted in writing the plant paper, did some bookkeeping for the Electric Auto-Lite (Saturday mornings), wrote 13 letters per week to 13 soldiers, sailors, marines, etc., that I've "adopted" (plus numerous other letters) and managed to work in a few Haig Bros. between 1 and 2 A. M. (I sleep from 2 until 9 ho hum!)

To continue . . . up until last Monday night—I was a little defense worker and filled with love for my country and an honest desire to help. I started with one firm. I appreciated that park benches are filled with those who "told off the boss," but honest to God, if you could see how those hillbillies pass the buck and get away with it. The stupidity of them, plus their actual lack of knowledge of even good English—to say nothing of their lack of knowledge of machinery, etc.—to boil it down—I gave up the ghost and silently stole away, but not until I'd busted into the Personnel Office and proceeded to attempt to put them wise to the actual lackadaisical and wishwashy waste that was going on.

So help me—my machine had the bearings burned out for four months. They absolutely refused to fix it and "machine repair" said it couldn't be fixed (they didn't want to, one man told me) so they shimmed it up and let it go at that!

The machine had no brake on it, either, so you either stopped it with your hand (I wore gloves), or let it run down—or bore down with a piece of leather, which slowed up the motor.

Oh, brother! I breathed a sigh of relief to get out of there. One man, to whom I talked in the main office, before I got into Personnel, listened to my story, then said, "You're a little angry"! (What was that supposed to do—put me in my place?). They don't want to listen to the little guy—they're too big—they've got too much to do.

I want to get into some war work (honestly) and have tried to do so. Today I waited exactly two hours to see a Mr. McDonnell at the Signal Corps (Detroit) to enlist my services in driving a jeep. So help me—he didn't know where the correct office was to enlist. Said he'd take my application quote if I wanted to leave it and I said no and went away from there. This particular office had cops

with huge clubs (the size of baseball bats) and in as much as it's purely an "office" with a few desks in it, I wondered WHY it took so many cops. There's so darned much red tape that by the time you've cut several miles of it, you're so darned tired that you either go out and get drunk or go get a job as a stenog and vow that never again will you ever try to be patriotic and enlist your services in the cause.

DOROTHY DASE

Detroit

TOOL-MAKING ADVICE

Sir:

A friend of mine in the Boston area has a fairly adequate shop and real experience in fine grinding—he is making plug gages now. But his experience is narrow. He is now figuring on a gadget that demands turning, centering, cutting off, milling, etc., and is scratching about how to set up the job, what materials to buy, order of doing operations, etc.

Isn't there some place where a man can take his troubles and get simple information of this kind?

A. W. MILLER

New York City

• Some chapters of the American Society of Tool Engineers have advisory committees to help those doing defense work (so has the American Society for Metals). Chairman of the A.S.T.E. Boston chapter is John W. Geddes, chief engineer of H. K. Porter, Inc., Everett, Mass. Tell your friend to get in touch with Mr. Geddes.—Ed.

TOOL DESIGN

Sir:

Could we obtain 35 copies of the reprint on "Tool Engineering Applied to Tool Design" by Frank W. Curtis, Chief Engineer, Van Norman Machine Tool Co., Springfield, Mass.? This reprint is from THE IRON AGE of March 20, 1941. We are interested in using this reprint in a class for tool and design apprentices.

JOHN R. PATLOW,
Vice Principal

Milwaukee Vocational School,
Milwaukee, Wis.

• We have none left but Mr. Curtis may be able to oblige.—Ed.

ONE "L" SHY

Sir:

You may knock the "l" out of Kelley and he will come up fighting, but when you knock the "l" out of Massillon, Ohio (Prices of Finished Iron and Steel, page 120 October 15 issue) you run the chance of being tackled by that town's mighty football eleven.

WM. D. MARTIN

Republic Steel Corp.,
Cleveland, Ohio

PRIORITIES GUIDE

Sir:

If you want to really help the war effort, it might be a good thing for you to send complimentary copies of the Priorities Guide to two or three of the head men in the U. S. Priorities Department in the Department of Munitions & Supply in Ottawa. It might help them considerably.

JOHN M. BISHOP
Accessories Manufacturers, Ltd.,
Montreal

• Thank you for the suggestion. We acted upon it.—Ed.

CUTTING TOOL GUIDE

Sir:

The information in "A Guide for the Proper Choice of Cutting Tools" will be very useful to the individuals in the Chicago Ordnance District, since Ordnance procurement is so much involved in extensive machining operations. If sufficient reprints are available, it will be greatly appreciated if you can supply approximately 25 copies.

S. C. MASSARI,
Capt.

Chicago Ordnance District,
Chicago, Ill.

• Glad to oblige. No charge.—Ed.

ARMASTEEL

Sir:

The Oct. 7 New York Herald Tribune published an article describing a steel substitute used by General Motors.

This material, the article stated, was given the trade name of Armasteel and is claimed to have unusual physical properties, and at the same time it is stated that all the ingredients are on the non-critical material list.

H. W. JOHNSON,
Asst. Chief Engineer
Celanese Corp. of America,
Newark, N. J.

• For information on "Armasteel," a pearlitic malleable iron made by the Saginaw Malleable Iron Division of General Motors Corp., at Saginaw, Mich., see the extensive report beginning on page 27 of the May 25, 1939 issue of THE IRON AGE.—Ed.

BRASS MACHINING TROUBLE

Sir:

We are having an increasing amount of difficulty in machining ordinary brass rod. Could you tell us whether this is due to any change in the composition of this material? Also would you let us know what is the best way of overcoming this difficulty? Is there any special kind of tool we can use? Or any particular cutting compound?

F. B.

• The brass companies report no change in the composition of free cutting brass rod, so the trouble must be due to another cause. If you still feel the fault lies with the material why not submit a specimen to the manufacturer? The chances are he will be glad to analyze it without charge.—Ed.



WHEN WE REACH OUR
OBJECTIVE

AS in military planning, American Industry must take into account now the procedures to be adopted after its present objective has been reached. For, once the final victory has been accomplished, the future of our country will rest with the ability of industry to answer the problems of where to go from there.

When Transue can again release the advantages of steel stampings to non-military purposes, there will be available improved designs, lower-cost pressed steel parts than ever before. Today's demands for unprecedented plant capacity, as well as the experience of meeting modern war requirements, are the factors contributing to this progress at Transue—and the same has happened in industry generally. The planned, speedy turning of this industrial strength to peacetime needs will go a long way toward overcoming any post-war problems that may exist.

TRANSUE & WILLIAMS

*Designers and Makers of
Deep Drawn Stampings*

ALLIANCE - OHIO

SALES OFFICES: NEW YORK, PHILADELPHIA,
CHICAGO, DETROIT, INDIANAPOLIS, CLEVELAND

THROW YOUR SCRAP INTO THE FIGHT

This Industrial Week . . .

- **Railroads Threatened by Equipment Shortage**
- **Poll Shows Third of War Workers Will Be Women**
- **Ingot Output Holds Unchanged at 100½ Per Cent**
- **WPB Approves Coast Steel Plant Expansion**
- **Shortages Delay Defense Plant Corp. Units**
- **Industry Awaits Controlled Materials Plan**

EVIDENCE that U. S. railroads will need more equipment to handle war traffic in the first quarter of 1943 is developing in some of the big war production centers.

For the first ten months of 1942 the railroads, helped by shippers, have maintained a fast pace although they were selected by some authorities early in the war as an industry which would fall down on the job and hamper the war effort.

Whether the carriers can continue to handle the tremendous movement of war goods without faltering in the early part of next year seems to depend on the promptness with which they are given additional locomotives, cars and rails. (U. S. railroads have asked for 9000 more locomotives and 80,000 cars for 1943.)

Industry generally has helped the railroads in taking steps to get the maximum use out of existing equipment. Steel manufacturers have been leaders in speeding unloading of cars, with some companies operating a system under which any car held more than 48 hours starts an investigation. ODT's recent order requiring cars to be loaded to their marked capacity may not produce the excess cars expected because many shippers in the metal industries have been loading to capacity for months. Since heavier loading will hasten breakdowns, more materials will be needed for repairs.

When material, such as steel, has been distributed to vital industries during this war, the carriers have come off none too well. A point has now been reached where any substantial increase in freight movement will turn rail transportation into one of the war's most difficult problems. Like so many other war problems, the lack of sufficient rail equipment in coming months is not likely to be solved by being ignored, or by being given the silent treatment.

FINAL results of THE IRON AGE manpower survey of 500 metal-working plants of varied sizes and locations show that the draft is making sharp inroads on factory forces, both skilled and unskilled, and that industrialists themselves have mixed views about how to man both war plants and the armed forces most efficiently.

Only 54 per cent of the metal plants, polled in the manpower survey, declared themselves in favor of a law forcing civilians to "work in a war plant or fight." Ninety-seven per cent of this cross section of U. S. industry opposed the singlehanded control by Roosevelt of unlimited power over wages and 99 per cent favored reclassifying war workers for the armed services if they go on strike.

APPROXIMATELY a third of all war plant workers will be women by the end of 1943, if events follow the trend indicated by this poll, which shows that 12.9 per cent of metalworking industry employees had been drafted up to Oct. 1. Sixty-six per cent of the companies reporting in the manpower survey

For complete results of THE IRON AGE manpower poll, turn to page 77.

already have training programs operating in their plants, a percentage which seems, at least in part, to answer criticism of industry that it did not see in advance the heavy losses to the services of all classifications of employees, including key workers, to the Army. Experiences of the polled companies show that approximately one-third of all draft deferment requests for their workers have been refused.

More than 61,000 steel workers entered the armed forces between Oct. 1, 1940, and June 30, 1942, according to a survey recently completed by the American Iron and Steel Institute. On the latter date the steel industry had 789,279 employees.

Canada, which frequently has solved war-raised problems more forthrightly than the U. S., on Oct. 23 froze steel workers and coal miners in their jobs until Feb. 15, 1943. These workers cannot be away without leave unless they are prepared to face a National Selective Service officer who has authority either to send them back to work or set in motion steps for drafting them into the armed forces. While a man may leave his job after giving seven days notice, he may not seek or accept a new job without a permit and no employer may interview or hire him unless he holds a permit. Thus, a hard blow is struck at absenteeism.

SO far, the labor shortages in U. S. industry have been spotty, with extent of the shortage depending on the industry and plant location. One point at which a serious shortage is occurring is in scrap yards, where lack of labor is preventing the early melting of material gathered recently in the national household scrap collection. In addition to labor shortages, scrap dealers are also hamstrung by lack of priorities for buying such essential material as acetylene gas, necessary for scrap cutting.

Household scrap is beginning to reach the mills in somewhat larger volume while the flow of industrial scrap is sharply higher. In the month ending Oct. 20, some areas succeeded in doubling their industrial collections of old metal. Some steel companies have

agreed to handle public scrap directly. At New York City, Bethlehem Steel Co. has agreed to take larger daily quantities than the dealers were able to handle.

While considerable tonnages of scrap are being brought out, steel plants are producing a larger tonnage of steel than ever before. Cold weather will hamper scrap collections. The mills have not been able to build up sufficient winter stocks.

THIS week steel ingot production in the U. S. was unchanged from last week at 100.5 per cent. Pittsburgh output is up a point to 102 per cent from last week's revised rate of 101 per cent. Narrow declines were reported in several steel producing areas. Chicago operations sagged a half point to 103 per cent and Philadelphia declined the same percentage to 93 per cent, as did Detroit output which is now at 101.5 per cent. Down two points in steel-making operations are Buffalo, at 104.5 per cent, and Cincinnati, at 107 per cent. St. Louis operations dropped four points to 107.5 per cent and Eastern District production sagged 13 points to 90.5 per cent. No changes in melting rates were reported from the big Youngstown and Cleveland districts.

Steel capacity on the West Coast will receive another increase when the \$26-million addition to the Fontana, Cal., plant of Kaiser Co., Inc., is completed. WPB has given the go-ahead signal for the building at Fontana of two 185-ton open hearth furnaces, with an annual capacity of 225,000 tons, a 28-in. structural mill, a merchant bar mill, alloy finishing facilities and slow

Iron ore for Kaiser's plant is being supplied from Southern California desert deposits, coal from mines in Utah, limestone from quarries a few miles from the Fontana plant.

cooling pits for ingots. Four open hearth furnaces already in construction at this plant will have an annual capacity of 450,000 tons. Other units being built include a 1200-ton blast furnace and a 110-in. plate mill.

Government plans for building detinning plants in 28 cities are going ahead, with projects carrying pri-

orities ranging from AA-3 to A-1-A. Some of the plants may yet be eliminated from the schedule. The projects at Carteret, N. J., Neville Island, Pittsburgh, and East Chicago, Ind., are now under construction. Ten new war chemical plants are to be built in Can-

For a listing of the proposed detinning plants and others now building, see page 92H.

ada, the first to be in production by Nov. 15. Plans for sharply reducing shipments of steel from the U. S. to Canada have been revised, hence the outlook for the Dominion's war industries has improved.

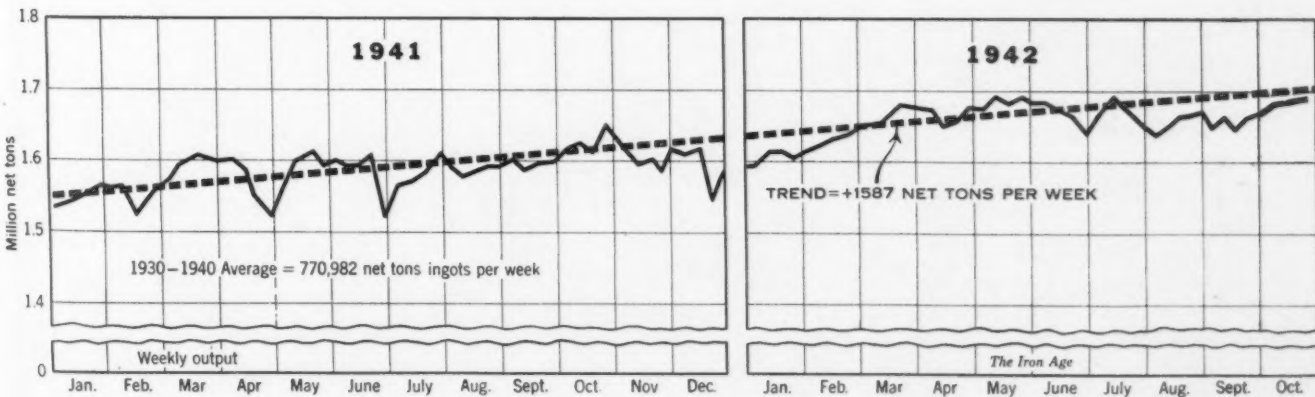
MATERIAL shortages are holding up completion of some of the major Defense Plant Corp. projects. In some cases, contractors are no longer able to adhere to completion dates. On one large blast furnace construction job, the contractor is seriously considering calling back all his field force, since some of the vitally-needed materials will not be delivered until 1943. (DPC orders are being pushed back on mill schedules by higher rated Army, Navy and Maritime Commission orders.)

Production of copper coated steel for bullet jackets for small arms ammunition is proceeding on a large scale in the Midwest. This material was developed to relieve the shortage in copper.

The long-awaited setup for distribution of steel and several other metals is now slated to be announced Nov. 2. It now bears the name "Controlled Materials Plan" and, subject to frequent minor revisions, is likely to be the Steel Quota Plan under another name. It is expected to provide for budgeting of steel needs by government agencies up to, but never beyond, industry's actual production capacity. (The Controlled Materials Plan seems likely to go into effect for the second quarter of 1943.)

WPB last week issued November steel mill production schedules, which tended to correct several unbalanced situations. Notable is the slightly larger quotas permitted on structurals and sheets.

The Iron Age



Steel Ingot Production by Districts Per Cent of Capacity

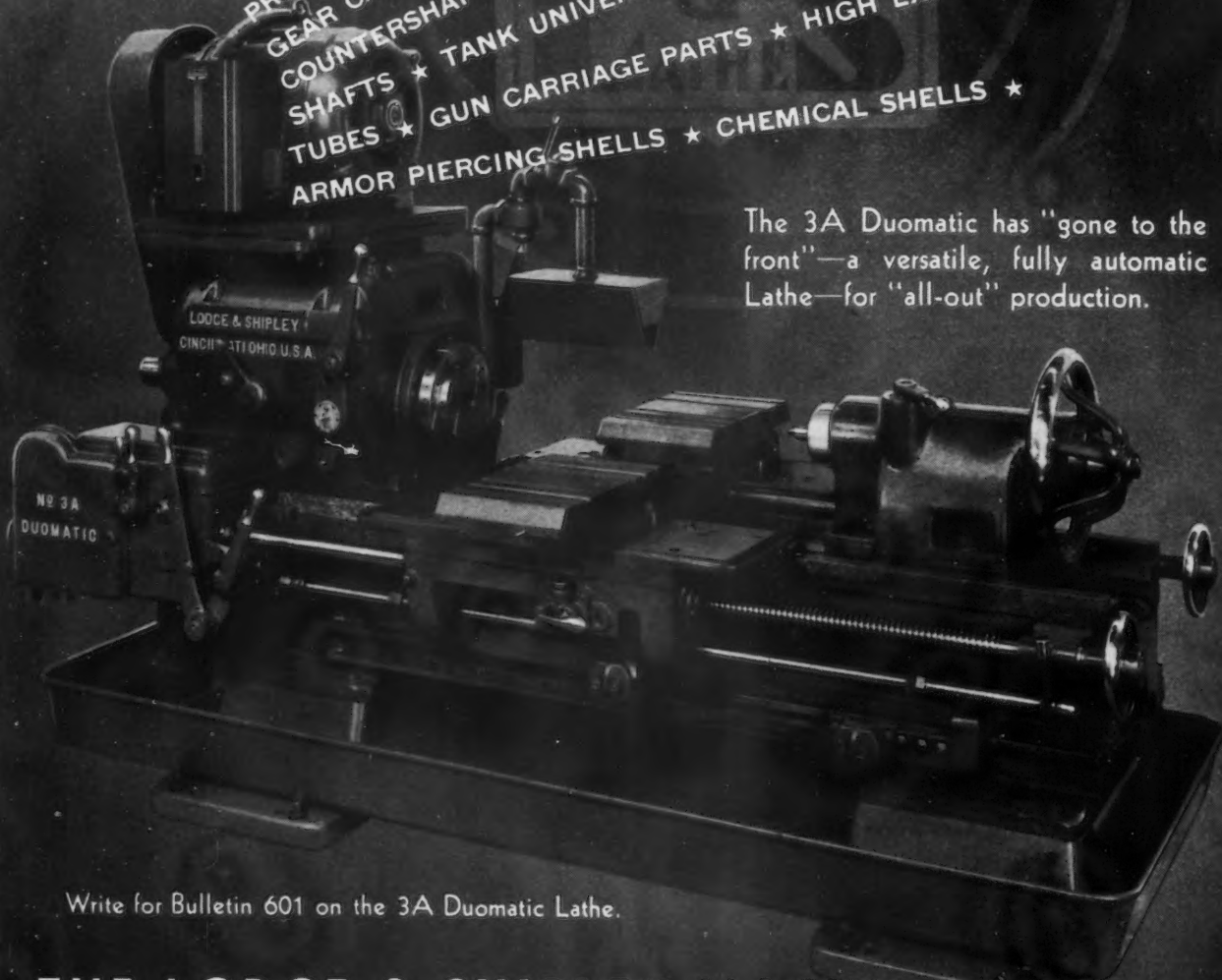
Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	S.Ohio River	West	St. Louis	East	Aggregate
October 22	101.0*	103.5	102.0	93.5	101.0	106.5	87.0	98.0	102.0*	109.0	102.0	111.5	103.5	100.5
October 29	102.0	103.0	102.0	93.0	101.0	104.5	87.0	93.0	101.5	107.0	102.0	107.5	90.5	100.5

* Revised

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ENGINE CRANKSHAFTS ★ AIRPLANE ENGINE
PROPELLER SHAFTS ★ AIRPLANE LANDING GEAR
AXLES ★ AIRPLANE LANDING GEAR PISTON TUBES ★
WHEELS ★ AIRPLANE PROPELLER SPIDERS ★ AIRPLANE TAIL
PROPELLER GEAR SEGMENT BLADES ★ AIRPLANE PINION REDUCTION
GEAR CAGES ★ TANK COMPENSATING DRIVE SHAFTS ★ TANK
COUNTERSHAFTS ★ TANK FINAL DRIVE SHAFTS ★ TANK INPUT
SHAFTS ★ TANK UNIVERSAL JOINTS ★ TANK SPINDLES ★ GUN
TUBES ★ GUN CARRIAGE PARTS ★ HIGH EXPLOSIVE SHELLS ★
ARMOR PIERCING SHELLS ★ CHEMICAL SHELLS ★

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Write for Bulletin 601 on the 3A Duomatic Lathe.

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CINCINNATI, OHIO, U. S. A.

ENGINE

TOOL ROOM

AUTOMATIC LATHES

News of Industry

Final Results Of Labor Poll

By D. C. MacDONALD

Associate Editor

••• In the final analysis of an industry-wide poll of the opinions of industry on the manpower situation, recently concluded by THE IRON AGE, it was found that most intense interest was shown regarding the questions of single-handed control of wages by the President and whether strikers deserved to be reclassified to 1-A for military duty as a disciplinary measure for striking.

Third in point of interest and most unpredictable and variable among individual returns, was the question of what types of control over labor should be included in a National Service Act, such as is now being demanded by chairman McNutt of the War Manpower Commission.

Five hundred metal industry companies, selected to represent a cross-section of the metal working industry, were asked to participate in the survey, which covered ten questions involving the important subject of manpower for war plants.

Regarding our need for a National Service Act, such as is now being called for by WMC chief McNutt, and the stipulations it should contain: 59 per cent believed we needed an act freezing jobs; 74 per cent favored an act

(CONFIDENTIAL)

IRON AGE MANPOWER QUESTIONNAIRE

1. Do you think we need a National Service Act to:

	Yes	No
a. Freeze Jobs	59%	31%
b. Control Labor Migration	74%	19%
c. Force Workers into War Industries	51%	39%
d. Abolish Racial Prejudices in Employment?	48%	42%
2. Do you believe the President should control the wage situation single-handed?

	Yes 3%	No 97%
--	--------	--------
3. Do you believe that war workers who strike should be reclassified for military service?

	Yes 99%	No 1%
--	---------	-------
4. About what percentage of your total employment have you lost to the draft up to Sept. 30?

12.9 %
5. About what percentage of your deferment requests are refused by the draft boards?

29.2 %
6. If your employment includes occupations suitable for women, what percentage of your total employment do you expect to be feminine by the end of 1943?

33.2 %
7. Do you have an organized training program in operation?

	Yes 66%	No 34%
--	---------	--------
8. As a result of your training program, about what percentage of your skilled workers are you in a position to replace.....quickly 8.1% & no. 22.1%

8.1% & no. 22.1%
9. Would you employ imported labor (from distant points in U. S.) if it were available to you?

	Yes 78%	No 16%
--	---------	--------
10. Are there living accommodations available for new workers coming into your area?

	Yes 21%	Some 53%	No 26%
--	---------	----------	--------

Remarks: _____

Please return to: The Iron Age, Manpower Editor, 100 E. 42 St., New York, N. Y.

MANPOWER SURVEY: The above questionnaire summarizes results of the IRON AGE Manpower Poll, participated in by hundreds of industrial companies.

which would control labor migration; 54 per cent believed law should force civilian workers into war industry; 48 per cent asked that any such legislation should eliminate racial prejudice in hiring (42 per cent did not).

Adding worries to the Congressmen who had just given the President practically unlimited powers over wages: 97 per cent believed that he should not have single-handed control of this phase of our war economies; 99 per cent favored reclassifying war workers to 1-A for the armed services if they went on strike.

In questions relating to the effect of the Selective Service draft of workers, it was learned that the nation-wide average loss of workers to the armed services has been 12.9 per cent up to September

30. It was also estimated that 29.2 per cent of all deferment requests have been refused by the local Selective Service Boards.

Balancing these losses, the compilation revealed that 33.2 per cent of all workers are expected to be women by the end of 1943 and that 66 per cent of those reporting (which included both large and small companies) had organized training programs functioning in their plants. As a result of training, it was estimated by those responding that 8.1 per cent of the skilled workers could be replaced quickly and 22.1 per cent in a period of six months.

Since the availability of living facilities seriously hampers the movement of workers from non-critical labor areas to critical ones the question of hiring imported

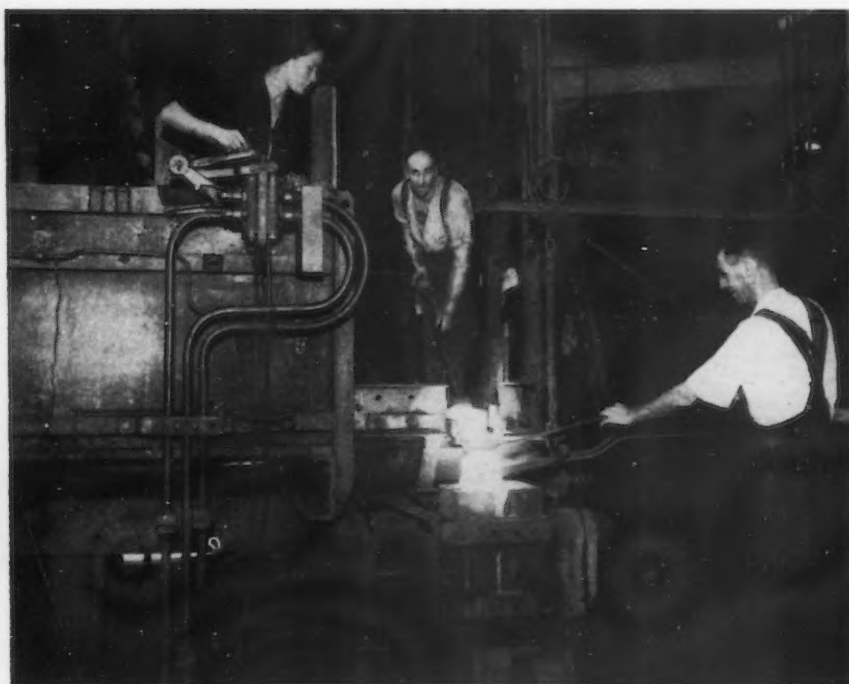
labor was grouped closely with that regarding available housing. To this set of questions 78 per cent said that they would hire help from distant points and 16 per cent refused. However, only 21 per cent claimed adequate housing facilities to care for newcomers, 53 per cent claimed some facilities and 26 per cent flatly claimed no available housing. Tracing this question still further, it was found that 34 per cent of those

the hand of organized labor at least for the duration of the war. It is also plainly reflected that industry is doing a fair job of cooperating with the labor privations of the Selective Service demands on manpower in that training programs are becoming the rule rather than the exception and by the expressed willingness to accept women as substitutes for drafted male workers.

With regard to labor-controlling

CAUTION! WOMAN AT WORK: This British girl, Miss Alice Towers, once a waitress in London, now holds forth in a Midlands war factory where she operates a billet squeezer. English women have taken up many factory jobs which have not yet been considered for women in this country.

British-Combine Photo



who would not hire out-of-state workers claimed no living accommodations.

An interesting side-study on the question of training programs for the replacement of drafted workers showed that 60 per cent of those who have lost over 15 per cent of their workers have a functioning training program. 40 per cent do not. Further, 68 per cent of those who have training programs claim to be able to replace at least 10 per cent of their employees (so far as training is concerned) within six months.

From the results of this survey it is apparent that the war industries generally are in a receptive mood for some type of legislation which will take the whip out of

legislation, although the figures show only 59 per cent in favor of job-freezing, the side comments which accompanied many of the forms which declined the idea, stated that some other form of control was more favorable to them. Thus, the need for control is admitted generally although the idea of compulsion (which is considered un-democratic) is not acceptable to at least 40 per cent.

Frequently, it is believed, the term job-freezing is somewhat misconstrued as representing a power which would stop upgrading, incentive and ambition. This need not be so if the law is written correctly as the principles of such legislation would be to stop labor piracy and migration from one industry to another.

The critical shortage of copper miners, who have been drawn to higher paid industries, is a current example of the necessity of such control. This situation has become so critical that men are about to be released from the Army to fill out the ranks of these miners. A job-freezing order by McNutt aimed at holding these miners on the job (an order without the teeth of enforcement) has apparently failed.

The need for labor migration control is also reflected in the figures compiled from THE IRON AGE survey which registered 74 per cent in favor of control. Actually, then, three-quarters of the industrialists favor migration control and as this might well be the major function of a job-freezing act, there would be little objection offered to job-freezing if the law is written properly.

Only 51 per cent favor forcing workers into war industries. This does not mean that the balance disagrees as 10 per cent did not express an opinion on the subject. In spite of the fact that it may not be comfortable to be forced into a war job there is very little real reason not to enforce such a measure when manpower is such a critical factor in winning the war.

The people of the United States complacently let Congress rush through a Selective Service Act which is now preparing to take every male from the high school age youngster to the settled middle-aged including those with children, for the armed service. If it is acceptable to countenance drafting for combatant duty it is inconceivable that a painless form of drafting into war industries is not proper. Opinion on this subject is unquestionably subject to a change.

Abolishment of racial prejudice in hiring was only lightly approved as a result of the survey by the slight lead over the non-approving of about 6 per cent. Many reported privately that the question was more or less nonexistent in their plant and, as a matter of fact, discussion of the subject arises most frequently as a result of unions, in certain instances, showing sign of discrimination against both Negroes and women.

The government's own policy has been very favorable to the Negro as is reflected in the repre-

sentative use of Negroes on rationing boards, in government agencies and in fact, in as many uses as the Negro has been able to adapt himself.


Any discrimination that might once have shown against women workers is fast disappearing as is reflected by the survey figure showing that 33.2 per cent of all employees are expected to be women by the end of 1943.

In many instances women are distinguishing themselves so well in various types of particularly adaptable work that it is doubtful if men are ever again employed for those specific jobs. This is not a general threat to male employment, even though women take over a high percentage of work, as a large proportion of women will be glad to return to their home duties after the war.

That women will fill a large percentage of jobs is illustrated by a TNT plant, once totally operated by men, which now employs about 60 per cent women. All industries cannot absorb so large a percentage due to heavy work involved but the average is due to hit a high level in the next 12 months.

That the manpower situation

WORKER PRIMER: Back here where no flash of gun-fire or smell of powder smoke stirs the blood to action, a new primer is being employed by the National Smelting Co., Cleveland, to spur efforts of their workers. Like a military oath of service this citation certificate is ascribed to workers making them bonafide "Production Soldiers."



Citation


PRODUCTION SOLDIER

★ Whereas he has this day dedicated his heart and his hands to serve his country's cause on the battle line of war production, and

★ Whereas he has taken the Production Soldier's oath, to back without thought of self for his country-men who have gone forth to meet the enemy on the battlefield, and has shown of his own free will to give of himself heart and soul in the fight against Fascist tyranny, so help him God; therefore, be it known that

★ has this day been proclaimed a Production Soldier, that he may serve as an inspiration to his fellow-men with the work of his hands and the fire of his spirit; that his example may thus hasten the blessed day of Victory and Peace, with Freedom for all.

In witness whereof, we do affix our hand,
this _____ day of _____, 194



will get worse instead of better, is hinted in the figures received on the number of workers lost to the armed services. Assuming that the 18-19 year draft law will be put into effect soon (which will rob many training programs of alert students) and considering the present step-up in drafting and enlistment appeals, it is reasonable to expect that at least 25 per cent of the present work force will have been assimilated by the armed forces by the end of 1943.

This compares favorably with the estimate that over 30 per cent of employees could be replaced by women but the fallacy of these figures lies in the fact that women cannot be expected to furnish the skilled background that would be normal to a man. Hence, although figure for figure enough workers may be represented in the reserve, an increasingly worse shortage of skilled workers will be experienced. How well the shuffling of skills to piece out the problem can be accomplished remains to be seen.

The survey revealed that almost a third of all draft deferment requests were refused by the draft boards and, as more and more pressure is applied to these boards to fill larger quotas, it is believed that this ratio of refusals will go much higher. Side comments from a great many of those reporting indicates that the draft boards have shown little consideration for the skill of a worker when considering deferment.

This of course is a spotty situation occurring in some localities and not in others due to the independence and lack of a unified policy among the Selective Service Boards. They seem to feel in most sections that they have been charged with the duty of manning an army to a certain quota and intend to do so at any cost.

Refuting this attitude, questions are starting to be asked as to whether this country needs a 10,000,000 man army at this time. It is being pointed out that one man in the army requires from 8 to 12 producers at home. Since so many skilled workers have been taken, and industry has started to feel the shortage, many question the advisability of so large an army if proper home production is to be jeopardized because of its size.

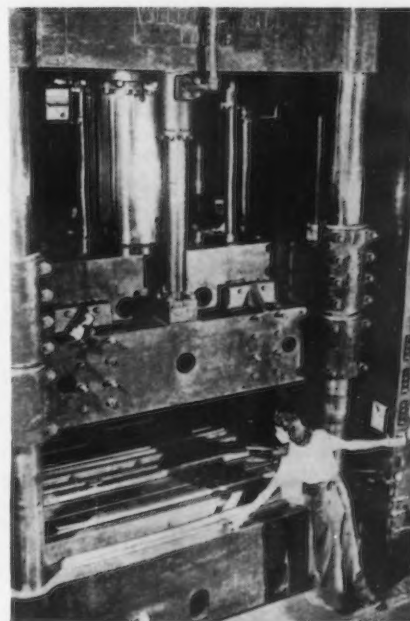
In spite of the sore needs of industry for manpower, the mood of the industrialists is expressed strongly by a 99 per cent return stating that war industry workers should be reclassified for immediate induction if they strike. Such a ruling would act as a definite curb to actual striking over the petty differences which have characterized most of this year's strikes, it is felt.

Probably the second most serious threat to war production and one closely interlocked with the manpower problem is the housing shortage in areas where labor is needed most. More than a quarter of all those answering the survey stated that no housing was available and another 53 per cent said that a limited amount was available. It is well known that in every really critical labor area of United States housing is not sufficient for the workers who are now there which precludes taking care of any new arrivals. This may eventually lead to decentralization of certain war industries.

First steps in this direction

THAT FEMININE TOUCH: Petite Lydia Martinez, 19, who is but five feet two herself and tips the scales at 105, regularly operates this giant hydraulic press. By comparison with Lydia, the press stands many feet in the air and develops a pressure of 4500 tons in the making of formed parts for Consolidated Aircraft's B-24 Liberator, PBV Catalinas and PB2Y Coronados.

Acme Photo





BIGGER WARTIME PROBLEMS AND MORE OF THEM

Each day of war brings tougher problems.

An army of questions stands at Management's door clamoring for attention . . . Prices? Wages? Variable Costs? Fixed Costs? Taxes? Marginal Income? Break-even Point? Conversion Processes? Priorities? Critical Materials? . . . and PROFITS?

And at no time in the history of business has there been greater need for specialized experience in gathering and organizing the necessary facts and figures . . . and in focusing these data on the problems in hand to GET QUICK ACTION!

Few company organizations have within their own experience all the knowledge required for the process of conversion to new products. Yet, there is available to all business, a store of experience in management engineering which can be quickly applied to any urgent war production activity.

A discussion as to how Trundle Engineers serve their many clients in such capacities and how they might serve you, will involve no obligation.

Geo. P. Trundle Jr.

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have already been taken by WPB who have been directed to place as many war contracts as feasible in areas where labor supplies are adequate and other facilities are suitable. This same progress may become a boon to small plants who were never before seriously considered for war contracts.

Three-quarters of those surveyed stated that they would hire men from any part of the country in order to get enough help although many who commented indicated that past experience with out-of-state help had not been any too satisfactory. Of those who declined to use so-called imported workers it is noted that 34 per cent indicated that no housing was available, hence was a governing factor in their decision.

One of the most prominent instances of hiring workers from distant localities was the attempt at mass hiring of 20,000 shipyard recruits for Henry J. Kaiser's Oregon shipyards from the New York district. This project has been started by the United States Employment Service and it is understood that about 3 to 4 thousand men have been hired and sent to the West Coast. Similarly notable about this hiring campaign was that the original request to the USES barred Negro help. This is understood to have been a demand of unionists which was soon withdrawn when USES refused to handle the order if discrimination was involved.

A broad view of the manpower situation seen through THE IRON AGE survey indicates that the labor problem is only half way to its peak of seriousness if control features are not applied immediately. Industry generally has been cooperative in trying to cope with the situation through training programs, which are definitely on the upgrade, and shows a willingness to accept women or any other kind of workers that can be supplied readily. The most baffling problems are those which require strict control by compulsion to handle, such as strikes, labor piracy, migration. Even piracy is understandable when every shop is starving for help and migration can only be attributed to the natural desire of the worker to get in "the money."

Strikes, likewise, have not proved controllable by means of

pledges to the President or any other voluntary means. These are factors in the labor picture that demand force to control (only because of their strangling effect) and over which control will soon be exorcised. Labor is at last becoming classified as a material just as vital to war production as steel, copper and aluminum which, as has been proved in the material supply field, needs control and meted distribution. The WMC may soon be the WPB of labor.

61,000 Steel Workers In Armed Forces

• • • More than 61,000 steel workers entered the armed forces between Oct. 1, 1940 and June 30, 1942, according to a survey recently completed by the American Iron and Steel Institute. Despite this loss of trained men, the tonnage of steel produced by the industry has increased substantially since the autumn of 1940, necessitating not only the replacement of the men called into military service, but also the employment of additional workers.

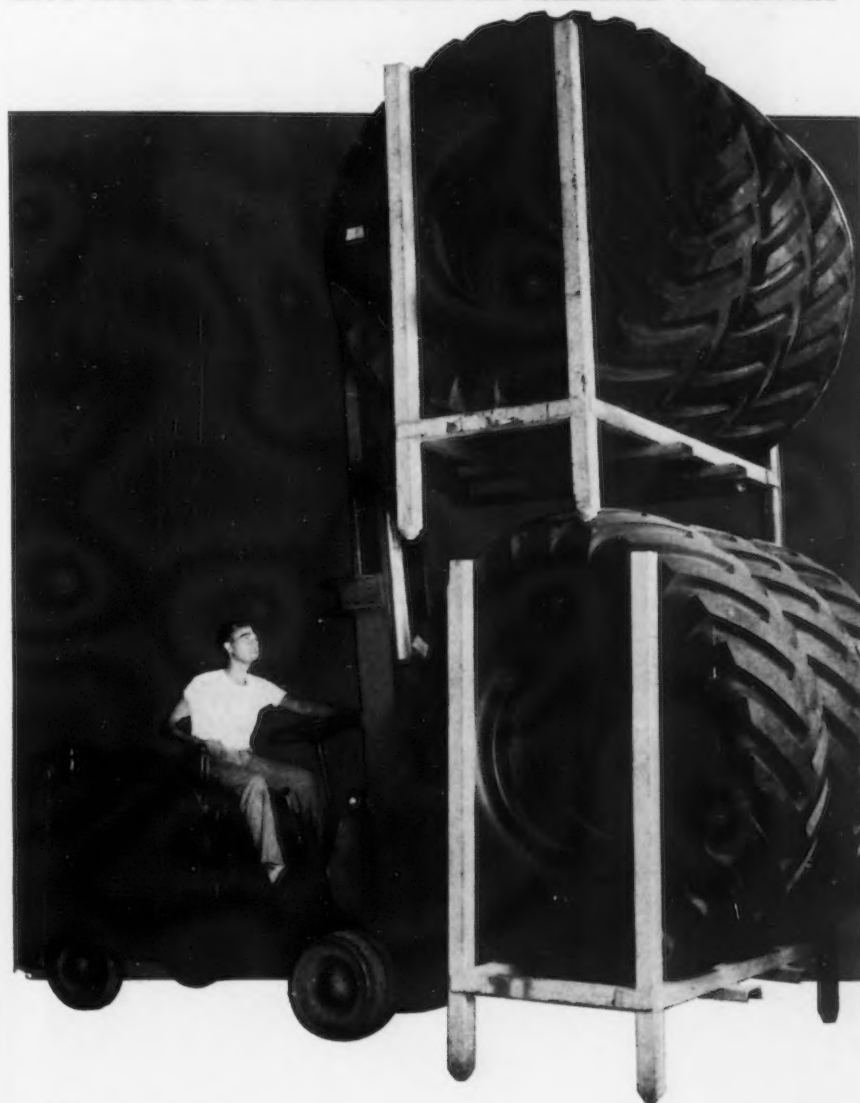
Draft and enlistment accounted for 56,737 of the 61,227 iron and



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steel men who have entered the armed services since the military training acts of 1940 went into effect. The remaining 4490 were called up by or volunteered for the National Guard, the Coast Guard, the Naval, Marine and Regular Army Reserves.

As of June 30, the steel companies surveyed had 789,279 employees on their payrolls, including employment in certain subsidiary companies which do not make iron and steel products. Nearly 65 per cent of these workers fall within the 20-44 year age group, and may soon face their Selective Service boards. If congress lowers the age limit to 18, a still greater percentage will, of course, be affected. Since enactment of the Selective Service Act, 44,293 requests for deferment were made by steel companies. Of these, 10 per cent were denied with 8 per cent still awaiting decision. The remaining 82 per cent of the deferments requested were granted by local draft boards.

WLB Plans 10 Offices For Wage Adjustments

• • • William H. Davis, chairman of the War Labor Board, stated in an interview in New York that WLB was planning to set up 10 regional offices to handle the requests of employers for permission to adjust wages within the limits of the wage stabilization plan.

He said the regional offices planned would provide machinery to facilitate requests of employers relative to wage adjustments but would not determine WLB policy or give final decisions. It is understood from Mr. Davis's statements that WLB does not plan to release any of its power to approve employer's requests to decentralized offices.

Wage Stabilization Acts To Curb Labor Piracy

• • • A new wage regulation designed to stop labor piracy through the lure of higher wages, met with the unanimous approval of the NWLB this week. These regulations are by-products of the new wage stabilization act and represent one of the first substantial moves made against the piracy problem.

The rulings, in effect, say that

no employer is permitted to hire an individual at a rate higher than that already established in the shop for equivalent work or skill. If such is attempted it represents a wage increase which is in violation of the new stabilization ruling, except with WLB approval. Further, if a wage level has not been established for the particular job classification in the employer's shop it is required that no higher than the prevailing wage in the area be paid. Thus, most of the lure of higher scales in nearby shops is eliminated and obedience is enforceable by law.

Structural Shipments Will Decline in 1943, Says May

• • • A decline of one-third in the volume of construction in 1943 is forecast by Stacy May, director of WPB's statistics division. In a telegram to Clyde G. Conley, president of the American Institute of Steel Construction, Mr. May said the volume of fabricated structural steel which will be required for building and engineering construction, exclusive of ship building in 1943, probably will amount to not over a million and a quarter tons. This compares to shipments of 2,251,089 tons last year and 1,600,000 (estimated) this year.

The structural steel industry should get contracts for work, he said.

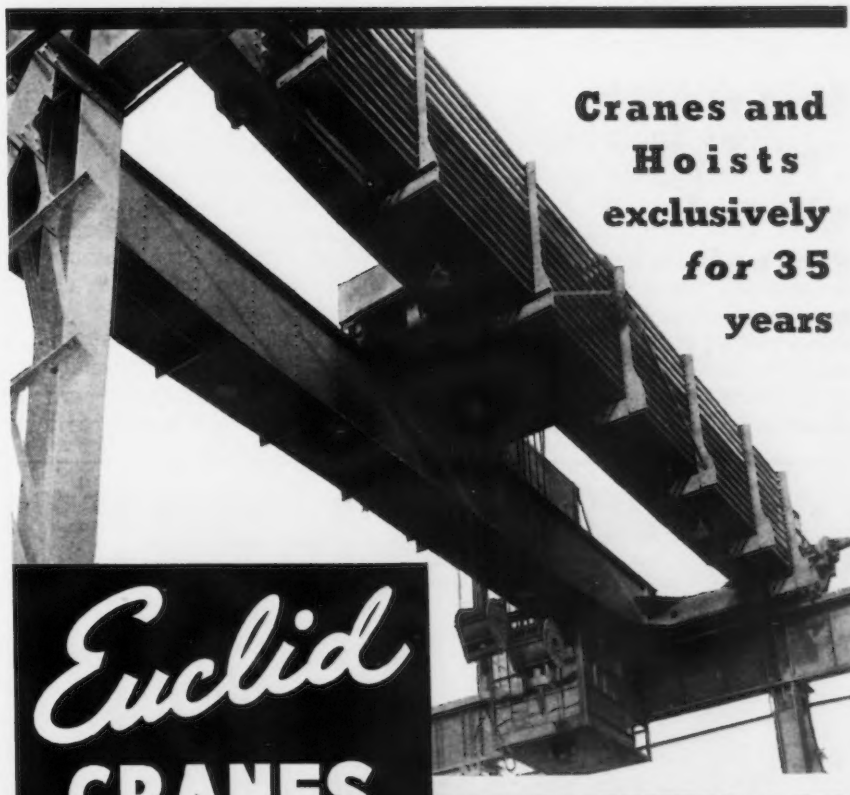
NOTICE FROM JAPAN: This is a copy of a Japanese handbill found in Tulagi island in the Solomons after U. S. marines took over. It was brought back to this country by Melvin R. Steves, Miami, Fla., a pharmacist's mate in the Navy.

P.A. Photo.

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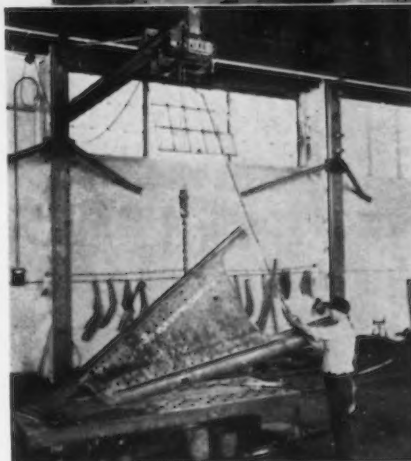
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Railroads Need More Equipment For War Traffic

Pittsburgh

••• The nation's railroads, in cooperation with their shippers, have done a good job with available equipment, but the point will soon be reached where the maximum amount of efficiency has been obtained from existing equipment,

according to steel and railroad authorities here.

The carriers could never have handled the amount of material unless complete cooperation had been forthcoming from American industry which has scrupulously endeavored to load and unload cars in record time. The lack of demurrage in recent months is a record in itself and obviously has resulted in more freight cars being available, with actual turnover

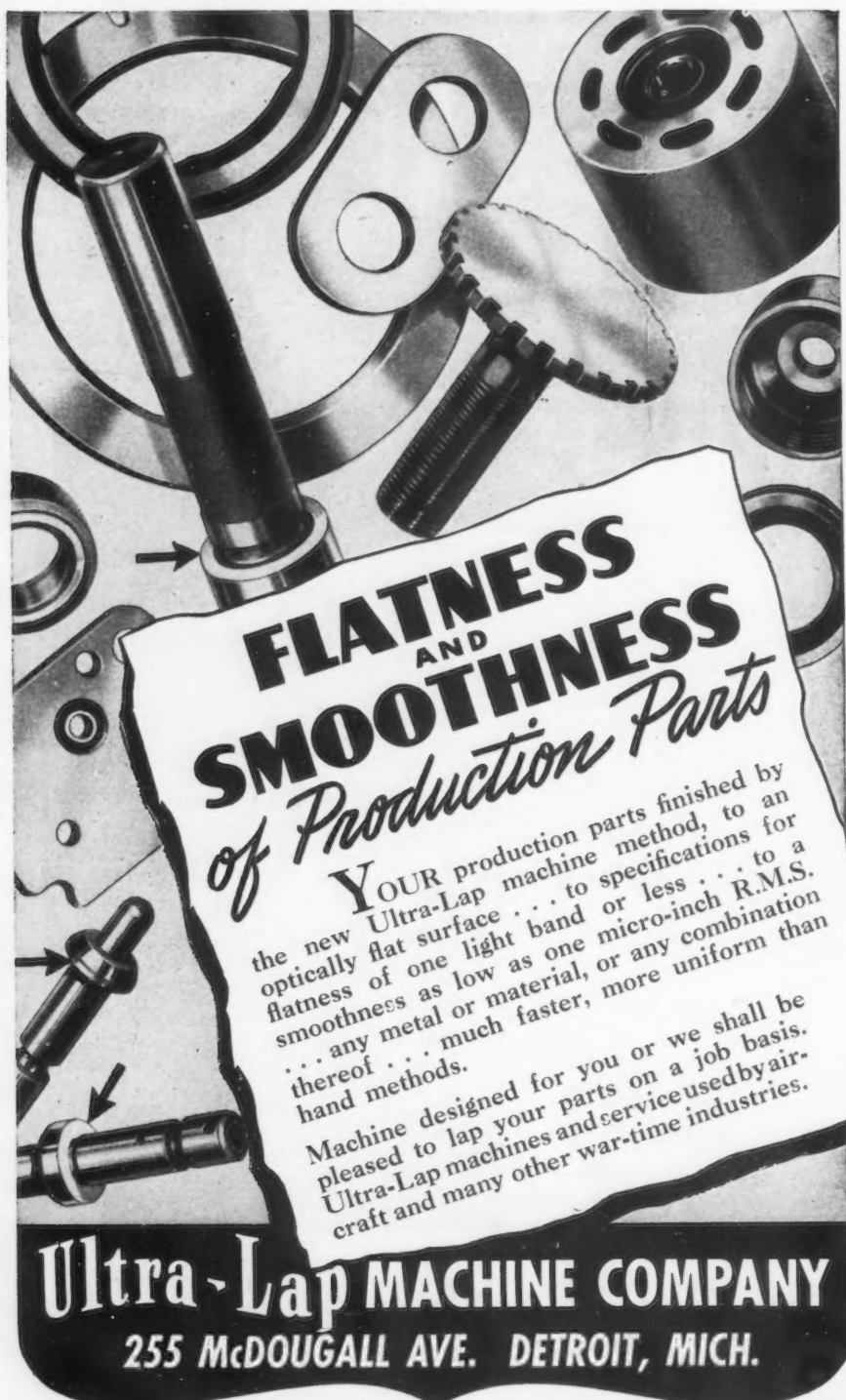
on cars being the greatest in railroad history.

The steel industry has been one of the leaders in rapidly loading and unloading freight cars. Many of the large steel companies have delegated specific duties to inspectors to see that any car which is held for more than 48 hours is thoroughly investigated. Such cases are given drastic action with the result that the car is usually soon on its way for further use. This same situation has been true in other industries and the general condition seems to be that the maximum turnover is now being obtained for railroad cars.

Movements of the office of defense transportation have also helped expedite shipping by such orders as a minimum of 10 tons for less than carload freight shipments. The recent order of the ODT requiring cars to be loaded to their marked capacity may not produce the excess cars which the ODT had expected. In the steel industry especially, it has been the practice for some time to load freight cars up to their marked weight.

Paradoxically, the uniform and general movement to load freight cars to their marked capacity will, according to some authorities, bring to light quicker breakdowns in cars which should have had heavy maintenance and servicing months ago. The drain on the railroads for freight cars has been so heavy that many of them which needed heavy maintenance repairs have only had light or temporary repairs. In some cases this has also been due to the railroads' inability to obtain quickly material needed for such repairs. There are hundreds of cars now in operation which are potential hazards for wrecks if they are loaded to the maximum marked weight, according to some authorities.

The War Production Board, because of what it thought to be more urgent demands, has nowhere near met the iron and steel requirements which the railroads believed were necessary to keep freight moving at its present rate. The carriers had to do the best they could and the present record of transportation has been brought about solely by cooperation be-



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tween the railroads and industry. This cooperation is now believed to have reached the point where any increase in freight movement over the next few months will hasten a crisis in the entire railroad movement question unless relief is forthcoming in the way of more locomotives, more cars, and more rails.

The railroads have asked for 9000 locomotives, 80,000 cars, and more than 2,000,000 tons of rails for next year if they are to maintain the present rate of service. Whether the WPB will finally admit that the transportation situation is racing towards a climax remains to be seen. There is belief in some quarters, however, that the WPB realizes the railroads do not have "much more rope" and must now be given more material which would be rated on a par with urgent war requirements. If this is not done and if traffic movement continues to increase at its present rate, there are some who believe that serious consequences in the form of wrecks, tie-ups, and car shortages will result. A severe winter, with its adverse weather conditions, would serve to further accentuate such conditions.

Poirier Goes to WPB Shipbuilding Division

••• C. F. Poirier, vice-president of the Crocker-Wheeler Electric Manufacturing Co., Ampere, N. J., has been released from his duties with the company to join the Shipbuilding Division of WPB. He will act as an electrical consultant to the division and is expected to be engaged in the analysis of the productive capacity of the electrical industry. Mr. Poirier has been associated with the WPB in an advisory capacity for several months, according to the company's announcement.

COMING EVENTS

Nov. 17 to 22—National Chemical Exposition, Chicago.
Nov. 30 to Dec. 3—American Society of Mechanical Engineers, annual meeting, Hotel Astor, New York.
Nov. 30 to Dec. 4—National Exposition of Power and Mechanical Engineering, New York.

Columbia Steel Co. Ends Tin Mill Unit Operation

San Francisco

••• Columbia Steel Co., subsidiary of U. S. Steel Corp., announced Oct. 22 a decision to discontinue, temporarily at least, its tin-mill operations at Pittsburg, Calif.

"To conserve critical materials the government has directed another 25 per cent decrease in the

rate of production of tin plate to be effective over the fourth quarter of 1942," the company said. "Because of previous similar government directives, Columbia's tin mill operations have been materially reduced. The latest directive would put Columbia's tin mill operations at only 37½ per cent of capacity, which, due to increasing difficulties in maintaining satisfactory work schedules, would be an impractical operation."

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much is obvious. Not as simple are the important calculations for determining the gradient of the spring, that is, the pounds per inch of deflection, and for finding the shearing stress in the coil, for each of the many types of springs. Here the knowledge of a specific spring maker such as Hunter, fortified by practical experience and a fund of laboratory research, speeds the right answers. Now, with production racing against time, and in the future, it will pay you to buy "science in springs" because there is only one right spring for the job.



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Canada to Develop Steep Rock Iron Mines

Toronto

••• C. D. Howe, Minister of Munitions and Supply announced that development of the Steep Rock Iron Mines in the Atikokan section of Ontario has been declared necessary to protect Canada against a possible shortage of iron ore to meet war needs. He stated that an order-in-council has been

passed that will provide Federal government assistance for the development of the company's iron ore deposits. The announcement is to the effect that the government will provide between \$2,000,000 and \$2,500,000 for the construction of an ore dock at Port Arthur, and the construction of a six-mile spur line from the Canadian National Railways line near Atikokan into the property. Further assistance will be given by

means of a subsidy on the rail freight rates on the first 5,000,000 tons of ore shipped from Atikokan to Port Arthur. Both the spur line and the dock will be operated as public facilities by the Canadian National Railways.

Development of the Steep Rock mine will necessitate construction of a power line from the main transformer station near Port Arthur to the property, Dr. T. H. Hogg, chairman of the Hydro Electric Power Commission of Ontario, stated. About 6000 hp. will be provided from present generator facilities on the Nipigon River for the mine development, including diversion of the Seine River and pumping out Steep Rock Lake. When actual production gets underway power requirements will be about 16,000 horsepower and this may necessitate installation of an additional generator unit at the Alexander Landing development on the Nipigon River, Dr. Hogg stated.

Considerable work has been carried out at the Steep Rock property, with a shaft on the main orebody down to a depth of 1200 ft. To the 1000 ft. depth on the main ore zone it is estimated there are 100,000,000 tons of ore, which will grade from 60 to 65 per cent iron. Under the more recent plans of the company, however, it is proposed to pump out Steep Rock Lake and attack the big orebody through open cut operations. Steep Rock has been before the Canadian public for several years, and without government support, there seemed little prospect of producing iron ore until long after the present war is over.

No More Brass for Brass Hats

Ottawa

••• Brass has been banned for use in hat badges, tunic buttons, buckles and webb equipment for Canada's armed forces, under a new ruling by G. C. Bateman, metals controller. Mr. Bateman said that shortage of brass is so acute it must be conserved by the services as well as the civilians. Enough will be saved by the new ruling to make 26,000,000 .303 rifle cartridge cases per month, he said. A hat badge of plastic will be standard issue in a few weeks; the metal parts of the webb equipment will be steel, coated with black finish.

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More Hours Available On Critical Machines

••• According to this week's report of idle hours available for war production on machine tools, issued by the Critical Tool Service of the War Production Board, there are nearly 200,000 more hours available this week than last. Last week total hours available on all types of machine tools was 3,058,639; this week the total is 3,233,458. These hours should be utilized to break production bottlenecks. The Critical Tool service has been responsible for the utilization of 22,011,466 otherwise idle tool hours in 5396 plants. See instructions and the table of available hours this week on page 101.

Munitions Production Shows Constant Gain

••• In spite of WPB Chief Donald M. Nelson's depressed attitude in reporting his opinions of war production, his third production report tends to bear out F.D.R.'s greater exuberance, by reflecting a constant and not inconsequential gain.

Nelson's report showed that the output of war material in August was 8 per cent greater than the July total. His depression was caused by the fact that the August total fell 14 per cent behind a theoretical goal set for the month.

The plain facts of the August production gains are:

Aircraft	Up 6 per cent over July
Ordnance	Up 3 per cent over July
Naval ship construction	Up 7 per cent over July
Merchant ship construction	Up 6 per cent over July
Other munitions ..	Up 14 per cent over July

Following the records back to their very beginning this table again reflects consistent improvement.

Munitions' Production Index*

The following table carries the munitions production index from July, 1940, through August, 1942:

Month	(November, 1941 = 100)	1941	1942
January	1940	41	163R
February	45	172R	
March	52	200R	
April	60	238R	
May	57	269R	
June	59	300R	
July	23	64	330R
August	22	72	357P
September	22	83	
October	27	91	
November	34	100	
December	50	133R	

R Revised.

P Preliminary.

* Munitions include planes, tanks, guns, ships and all war equipment used in the field. The Index has been revised from December, 1941, on the basis of more complete data.

McQuaid to Speak at Electric Metal Guild Meeting Pittsburgh

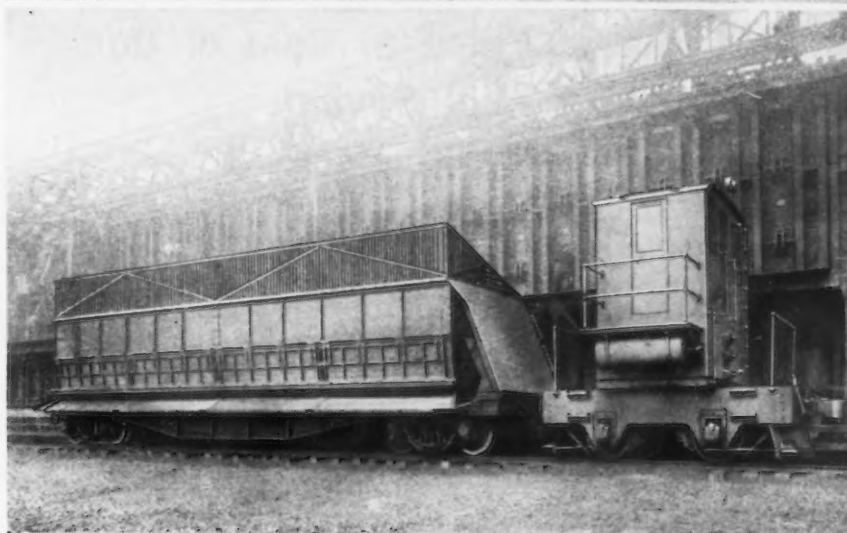
••• Harry W. McQuaid, Washington, industrial specialist, War Production Board, will lead a round-table discussion of the scrap metal situation and hot metal preparation at a sectional meeting of the Electric Metal Makers Guild, Inc., Roosevelt Hotel, Pitts-

burgh, Saturday afternoon, Oct. 31. Mr. McQuaid will be accompanied by representatives of the WPB scrap and steel divisions.

Following the afternoon meeting, there will be a special dinner at which General H. C. Minton, U.S.A., chief, Pittsburgh Ordnance District, will speak.

Harry F. Walther, of Timken Steel & Tube Co., Canton, Ohio, guild president, will preside.

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Third Quarter Profits Decline for Steel

•••Reflecting the effects of mounting taxes, higher labor costs and a general increase in factors affecting operating costs, the net profits of the steel companies reporting so far on their third quarter earnings show a definite decline. This, their stock holders wistfully realize, is happening at a time when their dollar volume

of business is at the highest point in history.

Republic Steel Corp. and its subsidiaries reported a net profit \$2,581,100 after deductions and an \$18,400,000 tax provision had been made. This compares with \$3,355,158 net profit in the second quarter of this year and with \$4,378,379 in the third quarter of 1941. This quarter's profit is equal to 37c. a common share compared with 50c. for the second quarter

and 68c. for the third quarter of 1941. For the first nine months of 1942 the corporation reports a net of \$10,653,221 or \$1.61 a share which compares with \$17,997,095 or \$2.90 a share for the corresponding period in 1941. Federal income and excess profits taxes for the 1942 period totalled \$54,200,000 against \$29,975,000 for last year's period.

Cleveland-Cliffs Iron Co. and its subsidiaries reported a net profit for the nine months' period of \$3,273,721, equal to \$6.72 each on 487,238 shares of \$5 cumulative preferred stock. This compares with \$3,621,730, or \$7.43 a preferred share shown in the same nine months of 1941. The company states that this report does not reflect the charge to surplus occasioned by the exchange of securities in the Jones & Laughlin deal.

Continental Steel Corp. and its subsidiaries declared a net profit for the nine month's period of \$218,251 after \$205,940 had been set aside for taxes. This profit shows an earning of 93c. per common share. In the second quarter of this year the corporation showed a profit of \$234,410 or \$1.02 a share. In the third quarter of 1941 the profit was \$294,592, or \$1.31 a share. For the nine-month period, Continental's profit was \$621,999 or \$2.63 compared with the same 1941 period which produced a profit of \$932,149, an earning of \$4.16 a common share. For the 12 months ending in September, the total profit was \$915,523 or \$3.95 a common share while the preceding 12 months had produced \$1,218,781 or a share earning of \$5.42.

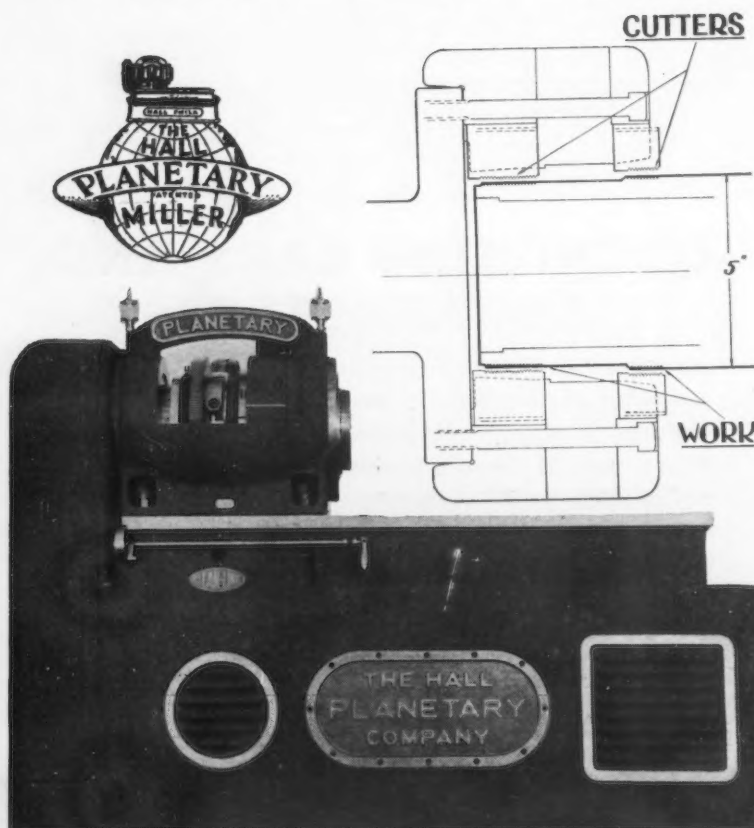
Truscon Steel Co. declared a third quarter profit of \$244,746 after all charges and a \$1,225,000 tax provision. This is equal to \$7.36 a share on 33,237 shares of 7 per cent preferred stock on which there is an accumulation of unpaid dividends. These figures compare with \$258,853 or \$7.79 a preferred share for the second quarter of 1942 and \$302,062 or \$9.09 a share for the third quarter of 1941.

Consolidated Steel Corporation, Ltd., California, reported for the fiscal year ending Aug. 31, a net

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WLB Approves More Steel Wage Increases

Washington

• • • WLB last week approved five contracts entered into between steel manufacturers and CIO's United Steelworkers. The contracts provide for a general wage increase of 5½c. an hour and a daily minimum guarantee of 78c. an hour, retroactive to Feb. 15 or 16, except in the Alan Wood Steel Co. case the contract establishes a minimum base rate of 72c., but any one on the minimum rate with six months continuous service shall have his rate adjusted to 78c. Besides Alan Wood, the other producers are American Chain & Cable Co., Mercer Tube Mfg. Co., Pittsburgh Steel Co., and Sharon Steel Corp.

profit of \$1,498,900 after taxes and deductions. The result is equal to \$10.54 a share on 142,189 shares of \$1.75 cumulative preferred stock. The accumulated unpaid dividends on this stock will amount to \$2 a share after the Nov. 9 payment of a \$2 dividend recently voted. The balance of the earnings is equal to \$5.17 a common share. In the preceding year the company had a net profit of \$667,518 or \$4.69 a share on the preferred and \$1.73 on the common.

Keystone Steel & Wire Co. declared a net profit for the third quarter of \$191,576, equal to 25c. each on 757,632 capital shares. This compares with an earning of \$352,414, or 47c. a share for the same period last year. The company's fiscal year ended June 30.

• • • A net profit of \$311,387 for the third quarter was reported by the Sharon Steel Corp. after all deductions including wages of \$272,000 applicable in accordance with the directive issued by the WLB on Aug. 26 and provision of \$892,000 for State and Federal income and excess profits taxes. The profit is equal to 60 cents each on 392,330 shares of common stock.

This compares with the net profit of \$386,900 or 79 cents a common share shown in the second quarter this year and with the net profit of \$412,899 or 86 cents a share on the common stock for the third quarter of 1941.

Clauss, Brown Join Iron-Steel Branch

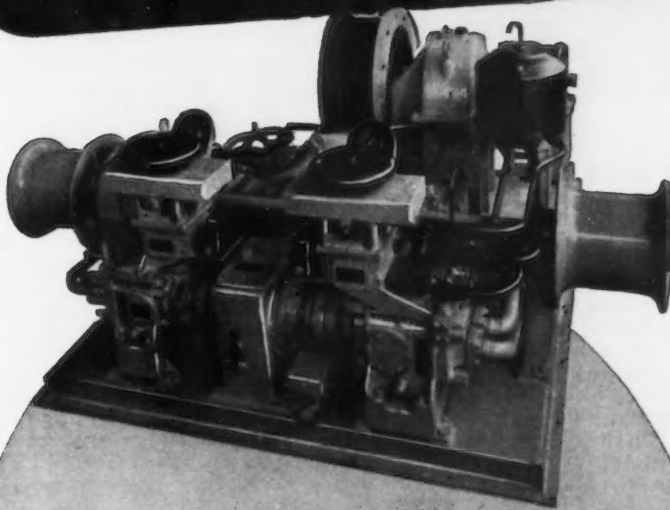
Washington

• • • Plant facilities construction personnel was strengthened by Highland G. Batcheller, WPB Iron and Steel Branch Chief, last week with the appointment of Julius Clauss, chief engineer of the Great Lakes Steel Corp. Also recently appointed was Edwin H. Brown, vice-

president of the Allis-Chalmers Mfg. Co., in charge of engineering, as assistant chief of the branch in charge of the Plant Facilities Section.

Mr. Brown succeeds Don N. Watkins who is returning to Pittsburgh to take up his post as president of Steel Publications, Inc. Mr. Brown has been with Allis-Chalmers for 36 years and his home is in Milwaukee.

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3500 Tons of Steel Saved by American Bridge Construction

Pittsburgh

••• By dismantling inoperative U. S. Steel properties in other localities, approximately 3500 tons of steel, enough to build two modern Navy destroyers, were conserved by the American Bridge Co., U. S. Steel subsidiary, in developing the new Navy yard on the Ohio River which is now turning out the Navy's latest type landing ship for tanks. This material, after thorough inspection and alteration to fit the requirements of the newly designed structures at the yard, was reerected to provide modern fabricating facilities.

Built and operated for the Navy by the American Bridge Co., assembly line methods are speeding the building of these tank landing

craft. Fabricating facilities of the new yard, which include a building having 5½ acres under roof, are supplemented by shops at the adjoining plant of American Bridge.

These combined facilities provide a self-contained, fully integrated unit which is producing completely outfitted, ready-for-service craft of this special type. Mill shapes and plates are fabricated and pre-assembled in sections of the various shops, and flow on to the ship berths. A complete modern outfitting dock is provided at the terminus of the launching ways.

All of the shipbuilding berths are serviced by overhead traveling cranes which facilitate the operations considerably. This, it is said, is one of the few yards where this type of equipment is in use.

Engineering Construction Tops Year Ago by 25 Per Cent

New York

••• Engineering construction volume for the week totals \$87,995,000, an increase of 25 per cent over the volume for the corresponding week last year, but 44 per cent lower than the total for the preceding week as reported by *Engineering News-Record*. Federal work, accounting for 91 per cent of the current week's volume, is 138 per cent above the 1941-week total, but is 44 per cent lower than a week ago. It is responsible for the 54 per cent gain in public construction as compared with last year, and is the principal reason for the 45 per cent drop in public work as compared with last week. Private construction is 72 and 11 per cent lower, respectively, than in the 1941 week, and in the preceding week.

AIRCRAFT BRAIN-TRUST: Aircraft War Production Council, East Coast, Inc., was organized this month to pool the engineering, research, manufacturing technique, facilities, materials and personnel of the East's leading aircraft manufacturers for the purpose of speeding war plane production. Its members are shown here grouped in their temporary headquarters, Rockefeller Plaza. Seated (left to right) are Glenn L. Martin, president of the Glenn L. Martin Co., who was elected vice-president of the Council; G. W. Vaughan, head of Curtiss-Wright Corp., and leader of the movement to organize the Council, who was elected president; and Victor Emanuel, president of The Aviation Corp. Standing (left to right) are O. L. Woodson, vice-president of Bell Aircraft Corp.; R. S. Damon, president of Republic Aviation Corp.; J. Carlton Ward, Jr., president of the Fairchild Airplane & Engine Corp.; L. C. Goad, general manager of the Eastern Aircraft Div. of General Motors Corp. and George Chapline, vice president of Brewster Aeronautical Corp.



Southern Ohio Mills Build Backlogs on Rated Orders

Cincinnati

••• With the rate of incoming business well in excess of the shipments, district mills continue to build substantial backlogs on all rated orders. The overall average backlog would be about one to one and one half months rollings. The picture is further complicated by the warehouse allocations which were just received during the past week. Mills, already hard put to keep steel moving to war industries direct, became more pressed to make room for the jobbers' demands. In fact, mill operators indicate that these directives have forced some high priority business onto the waiting list.

Short, Free Courses for Engineers Planned at Newark

••• Free courses in machine design, machine shop practice, and the metallurgy of modern alloys will be given this fall in periods of two weeks each at Newark College of Engineering, Newark, under supervision of A. R. Cullimore, president of the college, and Professor R. Widdop of the war training division of the U. S. Office of Education. The courses were compiled by A. H. Blanchard, Breeze Corporations, Inc.

Shopping One Cause Of Plant Absenteeism

New York

• • • A spokesman for the United States Employment Service here in a recent discussion described a method of dealing with absenteeism which has been effective in many plants. This plan was based on the assumption that many lost days were due to causes other than sickness and over-consumption and that the company personnel or welfare departments could take a hand in the matter.

Investigation proved that a good percentage of absenteeism was actually the result of such difficulties as rent evictions, summons to court hearings, jury calls and even the need for shopping.

By utilizing the welfare departments, particularly, it was often found possible to postpone hearings, settle irate landlords and generally lend the influence of the company in settling (and taking the time to do so) all or many of the employee's minor difficulties and in the meantime keep the employee working.

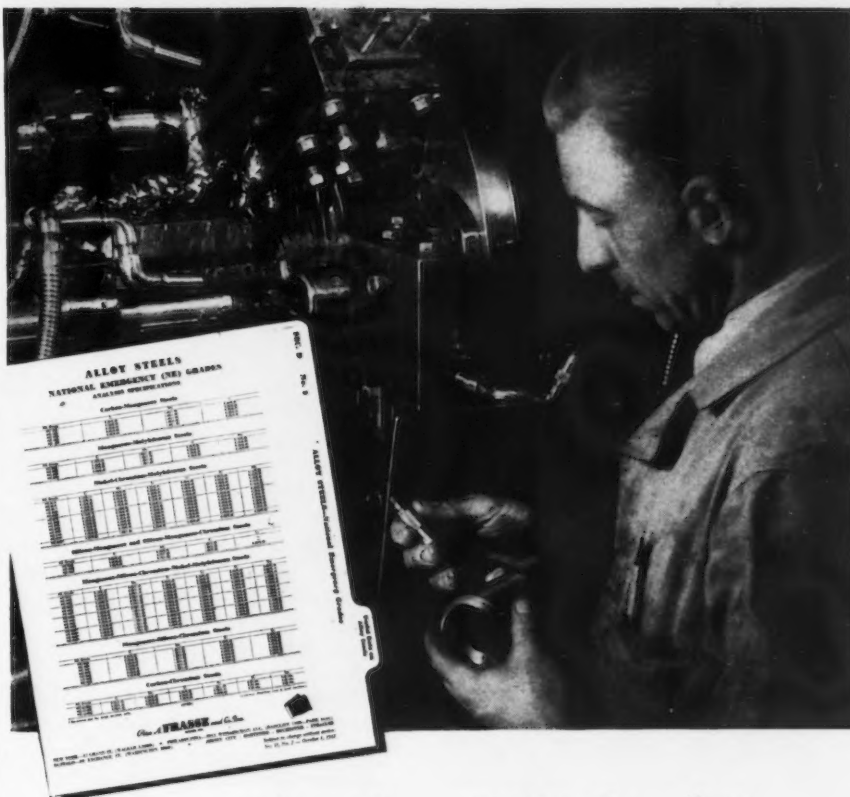
In instances where after-pay-day shopping sprees took workers away from their jobs (this can happen with women employees) it was found possible in some instances to have department stores change opening and closing hours to permit workers to shop on free time.

Shipments May Be Grouped For Export Licenses

Washington

• • • Exporters and export manufacturers were notified last Thursday by the Office of Exports, Board of Economic Warfare, that shipments of related commodities hereafter may be grouped under a single application for an export license. Previously, cargoes containing a variety of commodities required licenses for each commodity included. This authorization for grouping of items will bring about a heavy reduction in the number of export license applications filed daily with the Office of Exports.

According to the new export regulations, any combination of commodities within one of 64 selected groups may be entered on a single export license application.



Investigating NE Steels? Here's new, helpful data for you!

Already adopted in many war plants, NE steels will be increasingly used to substitute for standard alloy grades. If you are now testing or contemplating the use of NE steels, you'll find this new Frasse chart a handy guide.

Latest of the Frasse Data File series, it shows a complete list of recently revised NE analysis "specs", plus recommended alternatives for standard alloy steels. Both standard and NE grades are grouped, for convenience, according to approximate hardening values.

The chart is regular file size—just right for desk or wall, too. There's no charge—just mail the coupon below. Meanwhile, if you have a specific question regarding the use of these new grades, write or call Peter A. Frasse and Co., Inc., 17 Grand St., N. Y. (Walker 5-2200) • 3911 Wissabickon Avenue, Philadelphia (Radcliff 7100-Park 5541) • 50 Exchange St., Buffalo (Washington 2000) • Jersey City, Hartford, Rochester, Syracuse.

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Peter A. Frasse and Co., Inc.
Grand Street at Sixth Avenue, N.Y.C.

Please send me a free copy of your chart Sec. D, No. 2, showing NE "specs" and recommended alternates.

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Hood Praises U. S.

Productive Genius

• • • In an address before the National Wholesale Hardware Association and the American Hardware Manufacturers Association, in Chicago, on Monday evening, Oct. 19, Clifford F. Hood, president of American Steel & Wire Co., discussed "The Steel Industry in the War Effort." He compared the 7,000,000-ton monthly steel ingot production of the United States with the 6,000,000-ton production of Axis nations, including the German controlled countries of Europe and pointed out that while United States production totals some 86,000,000 tons a year, 30 per cent of this tonnage is lost in preparing ingots, trimming, rolling and forming them into usable shapes.

One of the greatest problems faced by the steel industry today and the WPB in Washington is scheduling and planning in order that the available steel may be distributed most efficiently. How-

ever, he cited examples whereby the productive genius of United States industry has permitted production of more materials for war at speeds far in excess of anything ever imagined. For instance, rifling a gun barrel used to take 30 times as long as it now takes and a few months ago more than six hours were required to counter-bore 280 holes in the crankcase of an aircraft engine—the time now required being 65 minutes.

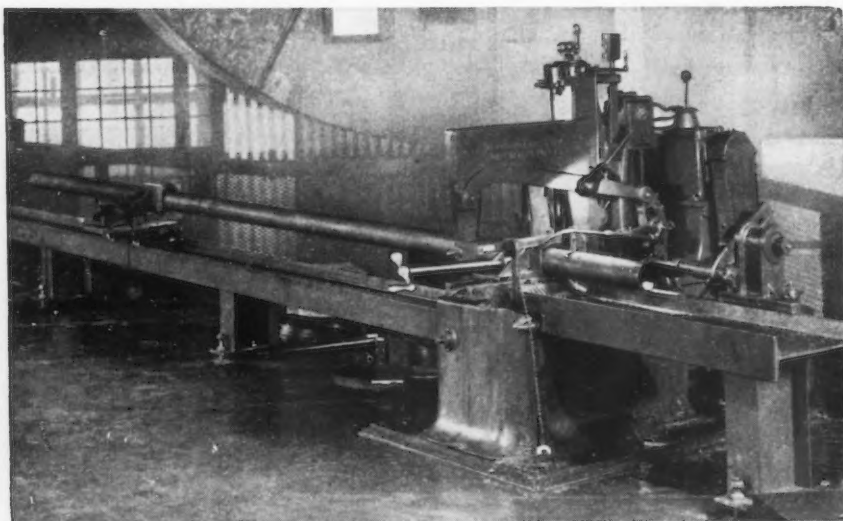
Touching on inventories, Mr. Hood stated that many fabricators, such as shipyards, require enormous stocks of shapes and plates to insure sufficient supplies to maintain continuous high operating rates. While in some cases this inventory situation has been overdone and an inordinate amount of steel has lain idle, some inventory is absolutely necessary to carrying on war production and inventories comprise another situation which contributes to the difficulties of scheduling and planning steel distribution. Mr. Hood stated that the cold hard facts are that American industry is cur-

rently pouring out a torrential stream of materials of war in the amount of almost one and a half billions of dollars per week. This is not just for goods contracted for, but it is goods paid for and delivered.

Mattison Posters Show Employees Part in War Effort

• • • "The Machines You Build, Producing Vital War Materials" is the topic of a series of illustrated posters which Mattison Machine Works, Rockford, Ill., is using throughout its plant as part of the employee educational program.

The posters show the machines built, the products they help produce, with copy explaining the work the machines are doing, to help bring home to the employees the important part they have in the war production effort. This is only one part of the employee educational program, which includes an employees' magazine, an apprentice training program, regular production committee meetings, and other features.



cut-off metal the economical way

The most economical method of cutting-off identical pieces from bar steel is with a MARVEL Automatic Production Saw. It will give you more pieces per hour, per machine and per dollar cost than any other accurate cutting-off method. Figured in cost per piece, it will have the lowest labor cost too, because MARVEL Automatic Saws operate with no more attention than an automatic screw machine. They keep chip loss down to a minimum and on many jobs will give you extra pieces per bar.

For cast automatic production or for single-cut miscellaneous work, MARVEL 6A or 9A Hack Saws are fast, accurate tools. Capacities 6" x 6" or 10" x 10", single or nested bars. Write today for Bulletin N. 600.



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"The Hack Saw People"
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Chicago, U.S.A.

Eastern Sales Office:
225 Lafayette St., New York

ZOOT PLIERS: A new sort of super-extension pliers has been developed for working in inaccessible places such as in the wing sections of airplanes by the Murray Corp. of America, Detroit. The pliers, operating on a principle similar to that of a telephone extender, can be made to extend as far as necessary and is said to be speeding-up many cramped-space jobs. One instance of their use is in the removal of skin clamps from the narrow spaces within the new Republic Thunderbolt P-47 wing sections. The idea has been turned over to the government for general use.



Ryerson Ends First Century, Starts Second



HEADS OF RYERSON: Edward L. Ryerson, left (grandson of Joseph T. Ryerson, center, founder of the 100-year-old Ryerson firm), is now chairman of both Ryerson and Inland Steel Co. Everett D. Graff, right, is president of Ryerson. He has been with the company 35 years.

••• One hundred years ago, about the time John Roebling was perfecting his new-fangled iron rope, a young man opened a small store in Chicago, calling it the "Pittsburgh Iron Store." That store, opened Nov. 1, 1842, marked the first step in the development of Joseph T. Ryerson & Son, Inc., which today stands as the largest steel-service warehouse organization in the world.

The young man who opened that store on the bank of the Chicago River where Wacker Drive and Clark Street now intersect was Joseph T. Ryerson, founder of the company which bears his name.

Joseph Ryerson's entrance into the iron business was not without reason. For, as far back as 1790, the Ryerson name was associated with the American iron industry. During the Revolutionary War, members of the Ryerson family operated iron mines and forges in New Jersey. They supplied part of the iron for the famous chain which was stretched across the Hudson River to blockade the British fleet.

The steady growth of the Ryerson company, through four wars and several periods of financial panic, is traceable largely to the policies laid down by the young

Joseph Ryerson. Summed up in one word, his creed was "service." And today, that creed of service is still the guiding influence for the men who lead the Ryerson company.

Young Joseph Ryerson was only 29 years old when he opened his first iron store. He started in with a very modest stock. One of his first advertisements in 1844 listed the following: Flat bar, tire, round, square, hoop, band, saddle tree, horse shoe, boiler, sheet iron, plough, spring, blister,

English and German steel, buggy springs, axles, wagon and Dearborn boxes, nails, brads, spikes, etc. In sharp contrast—today—Ryerson stocks would, under normal conditions, comprise more than 10,000 different steel items.

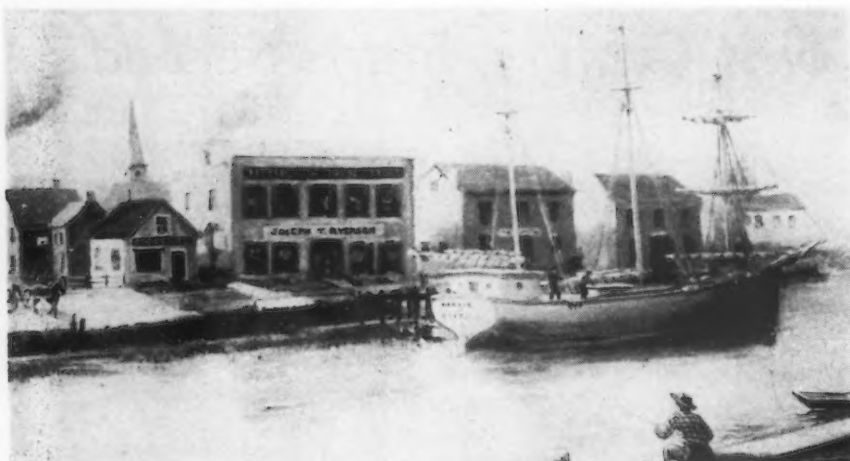
The growth of Chicago's first iron store closely paralleled the development of the nation's infant industries. Too, this growth typified the spirit of the founder who had said that he "never knew what it was to be scared of fate, or ever to lie down under difficulties."

Six months after the opening of his store, Ryerson moved to new and larger quarters to take care of his expanding business. He added a line of hardware. The Chicago area, then, had a population of 6000.

In 1852, with Chicago's population swollen to 30,000, a further business expansion was required. This time Ryerson purchased a dock site on what is now Chicago's Wacker Drive. In the disastrous Chicago fire of 1871 this plant was leveled to the ground. But Mr. Ryerson, living up to his reputation of never lying down under difficulties, promptly ordered new stock and set up temporary quarters while a new store

The Men Who Guided the Growth of Ryerson

Joseph T. Ryerson—Founder—active head until 1883
Edward L. Ryerson, Sr.—Partner—1878-1883
President—1883-1911
Chairman—1911-1928
Clyde M. Carr—President—1911-1923
Joseph T. Ryerson—President—1923-1929
Donald M. Ryerson—Chairman—1928-1932
Edward L. Ryerson—President—1929-1937
Chairman—Since 1937
Everett D. Graff—President—Since 1937



PITTSBURGH IRON STORE: This store, opened in 1842 by Joseph T. Ryerson, marked the beginning of the Ryerson steel warehouse firm, now the largest steel service organization in the world.

was being built. Business activities were still expanding in 1882, when Ryerson erected a three-story building north of the Chicago River on Milwaukee Avenue.

In 1883 Joseph T. Ryerson died. The business he had established was carried on by his son, Edward L. Ryerson, Sr., who incorporated the company as Joseph T. Ryerson & Son, Inc., in 1888. Four years later the business moved to its present quarters covering about 20 acres at 16th and Rockwell Streets, Chicago.

As men learned more of the qualities of iron and steel, and as

new and better ways of turning out metals were developed, the Ryerson organization, too, revised and improved its technique for distributing steel to consumers. By constantly working in harmony with both steel makers and users, Ryerson has been able to help both through each period of development.

As the number of steel applications increased, it became necessary to carry larger stocks. As special steels were developed, Ryerson carried these new items. Finally a point was reached, in 1916, when the stocks at the Ryerson

Chicago plant were greater than the combined warehouse stocks of any three other cities in the United States.

To maintain its reputation for prompt service, Ryerson expanded its facilities territorially. The first step was St. Louis, where the W. G. Hagar Iron Co. was acquired in 1914. This was followed in 1915 by the building of the new plant at Jersey City. In quick succession there followed plants at Detroit in 1916, Buffalo in 1919, Cincinnati in 1923, Milwaukee in 1924, Boston in 1926, Cleveland in 1927, and at Philadelphia in 1929.

In the early days of Joseph Ryerson's "iron store," the founder decided that it was just as vital to supply his customers with good metal-working tools as it was to supply them good iron. This department is one of the Ryerson functions today. For the Ryerson company still handles a varied line of metal working equipment.

One of the less spectacular, but highly important keystones in the development of the Ryerson organization to their present position, has been the constant effort to provide steel users with complete and accurate information concerning the steels which they buy and use. Constant metallurgical research, in Ryerson laboratories and in cooperation with steel mills and manufactur-

RYERSON'S LARGEST: Here is an interior view of Ryerson's Chicago plant, largest of its warehouses. The photo indicates the amount and variety of steel carried in stock in normal times.



ers, brought about the development of the "Ryerson Certified Steel Plan" in 1937. This was a plan for quality control which undoubtedly made Ryerson the first in the industry to carry steel in stock, accurately identified, certified as to quality, and accompanied with a statement of physical and chemical properties.

The company also inaugurated a special plan for alloy steels that included the selection of entire heats of steels that met the Ryerson specifications. The testing and heat treating of bars from each heat, and the positive identification of each bar. A chart accompanies each shipment of alloys to give accurate chemical and physical properties which enables the steel user to know in advance just what steel he is getting.

The Ryerson company, typical of the warehouse business, renders an important peace-time service by linking the small consumer with the mill. Through nearby warehouses, steel can be obtained in 24 hr. or less. In wartime, this service becomes even more important. Many war plants, which otherwise would have been forced to curtail operations or close down, have maintained operations through prompt shipment of steel from warehouses. By filling these small but important orders the steel-service plant eliminates the necessity for frequent roll changing at the mills, with attendant production delays. As a further contribution to the war effort the Ryerson organization is actively engaged in compiling information on the new NE steels.

The Ryerson company is still guided by descendants of the founder. Edward L. Ryerson, a grandson, is chairman of the board. He is also chairman of Inland Steel Co., now the parent organization. His brother, Joseph T. Ryerson, who served as president of the Ryerson company during World War I, is now a director of Inland Steel. Everett D. Graff, a veteran steel executive who has been with the company for 35 years, is now the president of Ryerson.

The many friends of the Ryerson organization join in congratulating them on 100 years of important service to the metal working industry and in wishing them God speed on the next 100 years.

War Contract Renegotiation— How, When, Why

Chicago

••• Over the past few months, a new word has been creeping into the lexicon of American industry—the word "renegotiation." To many plant executives, busy with immediate problems, the word has had an unpleasant connotation and not too much attention has been paid to it. Yet, like it or not, industry is going to become more familiar in the future with this word and what it signifies.

Renegotiation is commonly associated with the new authority given to the Army, Navy and Maritime Commission to renegotiate war contracts or otherwise recapture "excessive" profits made on war contracts. This authority is given in section 403 of public law 528.

To help industry better understand this new law, THE IRON AGE is publishing herewith answers to questions most frequently asked concerning renegotiation of war contracts.

Who Is Subject to the Renegotiation Act?

All war contracts and all prime and subcontractors are affected by the law. Definition of a contractor and subcontractor is rather hazy in the present law, but Congress is expected to shortly pass amendments to the law clarifying this definition. In general terms, it is expected that contractors and subcontractors will be defined as anyone having war contracts of an annual sales volume of \$100,000 or more, excepting producers with "wasting assets" such as oil wells, mines, lumber camps, etc. Commercial, or non-war sales do not come under the jurisdiction of the act.

What Are Excessive Profits?

There is no exact definition of "excessive" profits, due to the many variables that enter into each company's financial picture. However, Maurice Karker, chairman of the Price Adjustment Board of the War Department, has made this rough explanation. "Excessive profits is that part of the

profit which neither you nor I, if you were representing the contracting company, would be willing to defend. Or, to put it another way, it is that part of the profit of an individual company which two men, sitting down across a table, disinterested and detached, but with a background of experience, would agree as unjustifiable from work in arming the country for war."

Where Can I Get Further Information on the Renegotiation Act?

First take all your war business and divide it into three groups—Army, Navy and Maritime Commission. Then write to the Price Adjustment Board, at Washington, of the department whose contracts represent the largest share, on a dollar volume basis, of your war business. In most cases this will be the Army, as this service is responsible for about 90 per cent of all outstanding war contracts. Remember, commercial business is not affected by the renegotiation law.

For How Long a Period is a Company's Business Subject to Renegotiation?

For one year. The original law carried this liability for three years, but recent amendments have reduced this to one year. That is, one year from the date the company files its annual report.

Does Renegotiation Cover a Single Contract or All War Contracts?

It is estimated that there are several million war contracts outstanding. It would be obviously impossible to study all these contracts. Hence renegotiation covers the overall profit picture of the company. If potential excessive profits are found, the company can indicate what contract it is willing to renegotiate in order to reduce its profits. This choice rests with the company.

Can a Company Get Advance Clearance to Avoid Uncertainty?

Yes. Early in the year you can present a picture of what your company expects to earn during the year and if this is not excessive, you will be given advance clearance. Or, in other words, you will be told in advance that

what you expect to earn will not be considered excessive.

Does the Law Have Teeth?

Very definitely. The Army Price Adjustment Board has expressed the hope that all cases it meets can be settled by discussion without resort to the punitive aspects of the law. Thus far it has been successful in this respect.

Why Was the Renegotiation Law Passed?

War Department spokesmen put it this way: There are very, very few profiteers in industry. However, these few can give the entire industry a black eye. It hopes to eliminate such excessive profits as it finds as quickly as possible, to eliminate the possibility of repercussions after the war.

It is also pointed out that most companies are usually very conservative when making estimates for bids to insure that they will not be below actual cost when they get into production. Then when they do get into production, they find their costs much lower than had been expected and this may result, quite unintentionally, in their making "excessive" profits. In the past there has been no means of turning this back. The new law is intended to provide this means.

It is the intention of the Army price adjustment board to act so that low cost, efficient producers are not penalized. To the contrary, the Army has indicated an intention to encourage such producers whenever possible.

Mr. Karker, the Army board head, recently summed up the philosophy of the board in this manner. "We don't consider it any part of our job to do any experimenting with the American system. We don't believe that patriotism is determined by how close a company can come to bankruptcy. We do believe, however, that the American system is worth perpetuating; that is one of the freedoms we are fighting for. Financial strength is an essential of present day production as well as essential to the future welfare of business. It is our job not to determine how much profit a company should make, but how much it should not make. That is our approach in discussing renegotiation."

If a Company Makes "Excessive" Profits, Who Takes the First Steps in Renegotiating?

Either the company or the Price Adjustment Board. If a company feels that its earnings might be considered excessive, under the terms of the law, and wants to check its position, it can open the question with the board and if the profits are not excessive, the board will give it a clean bill of health, otherwise the matter can be discussed further toward renegotiating the company's war contracts. On the other hand, if the company does not open up the matter, the board must do so within one year, or else the matter becomes past history and is not subject to renegotiation after the year is up.

Contracts May be Grouped for Review

• • • Manufacturers whose overall profits are under review by governmental price adjustment agencies will not be subject to simultaneous review of individual contracts by contracting officers, according to a joint statement issued by the Price Adjustment Boards of the Army, Navy and Maritime Commission.

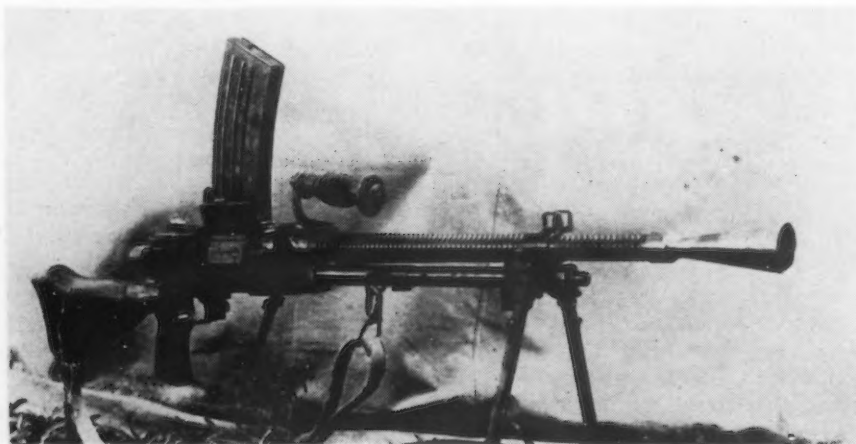
This policy is designed to eliminate duplication by permitting companies to consolidate all their individual contracts for review on an overall basis, by the price adjustment agency assigned to them, instead of having each individual contract reviewed by contracting officers.

Contracting officers will be informed when overall review has been started in order that companies will have only one group with which to deal. Contracting officers also will be notified when review has been concluded and an agreement reached with a company by any price adjustment board, section or branch.

Thereafter, while contracting officers may enter into new contracts, they will not seek price reductions on existing contracts except on deliveries to be made after the expiration of the period covered by the agreement. However, should the company find that profits for the balance of the period covered by the agreement are proving higher than contemplated at the time of the agreement, it may volunteer further price reductions.

JAP WEAPON: This light calibre machine gun was captured from the Japs by the U. S. Marines in Guadalcanal. The peculiar handle on the barrel is apparently for ease of carrying and the long bell-shaped muzzle is intended to hide the flashes of the gun fire.

Acme Photo



Booklet Tells How to Conserve Life of V-Belt Drives

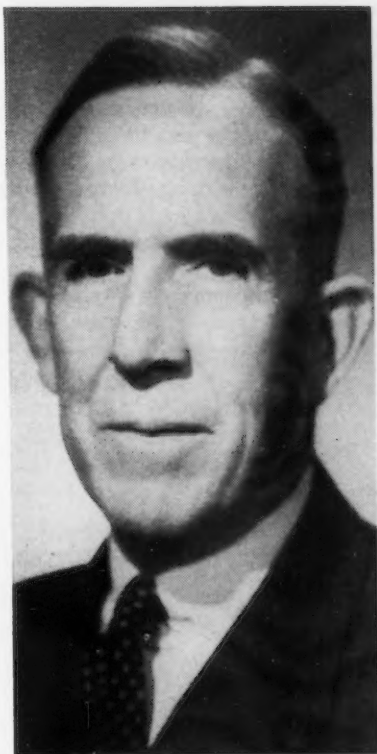
• • • The engineering research bureau of the Multiple V-Belt Drive Association has just issued a 16-page pamphlet entitled "23 Ways to Conserve the Life of Your Multiple V-Belt Drives." The purpose of the book is to educate power users in the proper procedure, selection, installation and maintenance of such drives in order to obtain the maximum life out of every V-belt.

The booklet is illustrated with simple sketches and is intended to be a primer on the subject. It is available free from the Multiple V-Belt Drive Association, 140 S. Dearborn Street, Chicago.

• • •

Emerson Findley Resigns Iron Age Advertising Post; Succeeded by Blair

• • •



EMERSON FINDLEY



ROBERT F. BLAIR

• • • Emerson Findley has resigned as Central Western manager of THE IRON AGE resident in Cleveland and after a short interval will devote himself to war work. The change removes from this publication's staff a name long known in industry. For 38 years his brother, A. I. Findley, was editor successively of two trade publications in the iron, steel and metal-working fields, first in Cleveland with the *Iron Trade Review*, and later in New York as editor-in-chief of THE IRON AGE. He was recognized as the dean of trade journalism.

As manager of the midwestern territory, Emerson Findley went to Cleveland in 1915 from the home office in New York, his college preparation having been acquired at the University of Akron, supplemented by work in the Harvard and Yale Graduate schools. He has been active in the Industrial Marketers Club, and

the University Club, is a trustee of the Citizens League, Baldwin-Wallace College, West Side Community House, Phillis Wheatley Association, and is a director of the Equity Savings & Loan Co. Mr. Findley will leave THE IRON AGE on Nov. 1. On Oct. 23, he was a guest of Chilton Co. directors at a luncheon in Philadelphia.

As successor in the Ohio territory THE IRON AGE has appointed Robert F. Blair, a life-long Cleveland and an associate in the company's Cleveland office for the past three years. Completing his service in War I as first lieutenant in field artillery, Mr. Blair followed his interest in advertising as business manager of the *Yale Record* with four years at Fuller & Smith & Ross in research and media. He has since been active in various merchandising fields and has been officially identified with trade association and labor relations work. Mr. Blair lives at 19600 Shaker Boulevard.

Cited for Award

• • • The following additional industrial plants have been named to receive the joint Army-Navy Production Award for outstanding performance on war work. This is the eleventh group of suppliers to receive the award since the Navy "E" and the Army "A" were combined.

Atlas Press Co., Kalamazoo, Mich.
Allegheny Ludlum Steel Corp., Brack-
enridge, Pa., and Watervliet, N. Y.

American Welding Co., Carbondale,
Pa.

Brunner Mfg. Co., Utica, N. Y.

Clarostat Mfg. Co., Inc., Brooklyn,
N. Y.

Divine Brothers Co., Utica, N. Y.

Fairchild Aviation Corp., Jamaica,
N. Y.

Folmer Graflex Corp., Rochester,
N. Y.

General Cable Corp., Perth Amboy,
N. J., and Rome, N. Y.

F. L. Jacobs Co., Volute Spring Sus-
pension Plant, Dearborn, Mich.

Jacobson & Co., Inc., New York.

Jessop Steel Co., Washington, Pa.

C. M. Kemp Mfg. Co., Baltimore.

Kennecott Wire & Cable Co., Phillips-
dale, R. I.

Martin-Schwartz, Inc., Mill Street
Plant, Salisbury, Md.

New Process Gear Co., Syracuse, N. Y.

Oneida, Ltd., Oneida, N. Y.

Remington Arms Co., Inc., Ilion, N. Y.

Ritter Co., Inc., Rochester, N. Y.

Ross Gear & Tool Co., Lafayette, Ind.

Savage Arms Corp., Stevens Arms
Co., River Plant, Chicopee Falls,
Mass.

A. Schrader's Son, Division of Scovill
Mfg. Co., Inc., Brooklyn.

Scott Aviation Corp., Lancaster, N. Y.

Solar Aircraft Co., San Diego, Cal.

Solvay Process Co., Hopewell, Va.

Spicer Mfg. Corp., Toledo.

Test in Ohio May Be Key to Sponge Iron

Washington

• • • Expected to be in operation in about four to six months, the experimental 100-ton \$450,000 direct reduction process plant to be built by the Republic Steel Corp., at Youngstown, Ohio, promises to be a test whether there will or will not be a large-scale development of sponge iron production.

is totally reduced. Experience, however, it was added, may be gained from operation of the plant looking toward economically sound production of sponge iron, something that never has been achieved so far from the average grade of American iron ore. The Republic project has been recommended to the Defense Plant Corp. for financing.

As pointed out by Mr. Nelson in relating that "steel experts are divided on the possibilities of pro-

hematite ore not as yet found suitable for making sponge iron, while direct reduction of magnetite ore, found in much smaller quantities, is practical by use of such processes as the Brassert-Cape process which Republic will employ.

A hotly disputed question, the Senate Truman Committee and the Boykin subcommittee of the House Committee on Merchant Marine have been hammering insistently and have been supported by Secretary of the Interior Ickes for



Wide-World Photo

UTAH STEEL SOON: First view of the construction of the new \$150-million Geneva Works steel plant being built by the Columbia Steel Co., a subsidiary of U. S. Steel, for the Defense Plant Corp., near Provo, Utah. This view shows the completed foundation for the blast furnace cast house.

A program for the development of the sponge iron process and approval of the Republic plan was announced last week by WPB Chairman Donald M. Nelson. The proposed Republic installation was referred to as a sponge iron plant. Republic will use the iron to charge electric furnaces. Metallurgists do not accept that description. They say that in reality it will be a "direct hard iron" plant and not a sponge iron plant. They make the distinction that the "hard iron" will be about 90 per cent reduced whereas sponge iron

producing in important commercial quantities sponge iron suitable for steel making" the Republic proposal differs somewhat from the sponge iron process. He explained that Republic contemplates the use of high-grade concentrates from the magnetite ores mined in the Adirondacks, in upper New York state, "as contrasted with the low-grade ores generally used for iron making." Issue may be taken with the reference to "low-grade ores" generally used in the United States, since the vast bulk of ores is not low in iron content. It is

widespread installations of sponge iron plants at the country's iron ore mines, especially in the middle and far West. They affect to see in this development the heavy production of tonnage to overcome the scrap shortage. Announcement of the "sponge iron" program came on the heels of a hearing before the House subcommittee.

The WPB program in addition to approving the Republic plan includes the setting up of a committee by Iron and Steel Branch Chief H. G. Batcheller "to consider ways and means to cope with

the shortage of scrap and advise him on the practicability of other individual sponge iron projects which have been submitted to WPB." Mr. Nelson said that the committee, to be known as the Steel-Using Advisory Committee, will consist of individuals with broad, practical and technical experience.

Mr. Nelson said that the only way to test thoroughly the possibilities of sponge iron "is to go ahead with one or two moderate-sized plants, and see what results can be obtained." He explained that the subject has been thoroughly studied by WPB for the past several months, but that wide-scale adoption of the process has not been possible because of technical problems involved. The Republic project, however, he said, presents an opportunity to give sponge iron a real chance under the most favorable conditions.

"Our position is that testing of the sponge iron process is worthwhile, and that we must not 'miss any bets' in investigating all possibilities of adding to our supplies of steel," the WPB Chairman said.

He expressed his appreciation for the assistance given WPB by the Truman Committee.

"Senator Truman and his committee have been most helpful in making available to us the results of their own investigations in the matter," the chairman said.

Mr. Nelson said that it is hoped that this specialized use of the sponge iron process will result in actual operating experience which can be applied, if successful, to other suitable ores where gas is available. He added that proponents of sponge iron have asserted for some time that it is a satisfactory substitute for scrap iron, which along with pig iron, is one of the two important metallics needed to make steel. Such sponge iron plants, it has been urged, should be built instead of adding to the pig iron capacity as a means of combatting the scrap shortage. Those differing with this suggestion assert that sponge iron is not a satisfactory substitute.

The sponge iron process involves the reduction of iron ore to a spongy mass of iron by heating the ore at a temperature below the fusing point of iron. The oxygen content is removed at the same time, either by mixing the iron ore

with pulverized coal, or passing a reducing gas through it. Under the present method of operation, iron ore is converted to pig iron in the blast furnace, before going to the open hearth furnace, bessemer converter or electric furnace for manufacture into steel.

That WPB had approved the Republic plan was first made known publicly by H. Leroy Whitney, technical consultant of the WPB, when he testified before the Boykin Committee on Tuesday of last week. He said that the Brassert-Cape process requires the building of a Hereshoff furnace with a grate in the bottom so that sulphur-free coke gas can be bubbled through the ore. This, it was pointed out, has the effect of removing impurities and as the purified ore is conveyed along it is deposited on briquetting rolls. The advantage of the direct movement of the reduced ore to the rolls, it was stated, is that deoxidation is thereby prevented.

SEA-GOING RELICS FOR SCRAP:

Shipyards workers in Brooklyn turned up these old cannon in the bilge of a ship they were repairing. No one knows how these relics came to be there but experts claim that they are at least 130 years old. The shipyard workers, who are a separate unit in the New York scrap drive, were quick to consign these relics to swell the 32,445,000 lb. of scrap they have already turned in.

International News Photo



In mentioning the fact that the metal produced by Republic would be used for alloy steels, Mr. Whitney spoke of steel supply and said that the shortage in alloys is now in electric furnace capacity and not in the alloying metals as was previously thought.

Henry J. Brassert, whose process Republic is to use, testified that it was expected that direct conversion iron could be made at the proposed Republic plant for approximately \$14.57 a ton, plus RFC financing charges of \$5, for a total of \$19.57 a ton. Mr. Brassert pointed out that German and American experiments with the sponge iron process on the whole were failures because they furnished the steel industry with a type that was impure and inferior. He characterized sponge iron as a loose irregular mass which was not suited to steel company needs. However, he did say that the H. G. S. Anderson process for the production of sponge iron was practical, though very expensive.

Mr. Brassert testified that the problem in steel-making now was getting sufficient scrap and he thought his method the cheapest one. He also said that it would take less than half the time to build a 1000-ton Hereshoff furnace than it would to build an ordinary blast furnace.

WPB Forms Facility Clearance Board

Washington

• • • To act for it on all military and civilian facility and construction projects, WPB has organized a Facility Clearance Board and a Facility Review Committee. The Facility Clearance Board will pass on all new projects costing \$500,000 or more. The Facility Review Committee will pass on all new projects costing between \$100,000 and \$500,000 and review all projects now under way, regardless of cost. Both the Board and the Committee report to Ferdinand Eberstadt, vice-chairman on Program Determination. Mr. Eberstadt is chairman of the Facility Clearance Board and its acting chairman is Col. Gordon E. Textor. Colonel Textor also represents Mr. Eberstadt as Chairman of the Facility Review Committee, and Fred Searls, who under Mr. Eberstadt is the head of the Facilities and Construction Program Branch.

Detinning Plants in 28 Cities Are Listed

Cleveland

• • • Long stressing the need for the conservation of tin and realizing the extensive recovery of this critical metal from tin cans that have been heretofore finding their way to the rubbish piles, the Defense Plant Corp. has been considering the construction of detinning plants for many months. It wasn't until recently, however, that work actually got under way, when the H. K. Ferguson Co., Cleveland, was appointed to build cleaning, shredding and detinning plants in 28 cities throughout the United States.

At least a half dozen detinning plants have been in operation as private enterprises for some time, these being units of the Metal & Thermit Co. at Carteret, N. J.; Vulcan Detinning Co., at Sewaren, N. J., and Neville Island, Pittsburgh; Standard Metal Refining Co. at Baltimore; Johnston & Jennings Co., at Cleveland, and the Los Angeles By-Products Co., Los Angeles.

Consequently, these operators were the first chosen to operate the new DPC plants, and will account for the running of at least 10 of the new projects. In addition, the Shredded Steel Co. has been picked to operate the new shredding, cleaning and detinning plant that will be built in Dallas, Texas.

Not all of the new units will have complete shredding, cleaning and detinning facilities. Ten of the plants will be shredding plants only, another six will have both shredding and cleaning facilities, and six more plants will have facilities for shredding, cleaning, and detinning. Just what will be the extent of the remaining six plants to be constructed has yet to be decided.

The projects at Carteret, N. J., Neville Island, and East Chicago, Ind., are now under construction, and the plant site for the New York City unit has been chosen. For the remaining 24 plants, the cities have been chosen, but actual plant sites have to be picked.

How quickly completion of the expanded detinning facilities can be achieved is also pretty much of a problem, since preference ratings assigned to the projects range

from AA-3 to A-1-A. Four of the plants carry AA-3 ratings, 21 carry AA-4 ratings two carry A-1-A ratings, and one plant has not yet been assigned a rating. Furthermore, with WPB seriously considering the further curtailment of new building, some of these plants may be eliminated from the schedule.

From the following schedule, the status of both the new projects and the projects already in operation can be seen.

CITY	PRESENT FACILITIES	NEW UNITS	OPERATOR
Carteret, N. J.	D	S and C	Metals & Thermit Company
Sewaren, N. J.	D	S and C	Vulcan Detinning Company
Neville Island, Pa.	D	S and C	Vulcan Detinning Company
East Chicago, Ind.	None	S and C	Metals & Thermit Company
Baltimore, Md.	D	S and C	Standard Metal Refining Company
Philadelphia	None	S	Not chosen
Washington, D. C.	None	S	Not chosen
Syracuse, N. Y.	None	S	Not chosen
Cleveland	D	S	Not chosen, probably Johnston & Jennings Co.
Cincinnati	None	S	Not chosen
Detroit	None	S	Not chosen
Toledo	None	S	Not chosen
Boston "A" Plant	None	S	Not chosen
Boston "B" Plant	None	S	Not chosen
Providence, R. I.	None	S	Not chosen
New York**	None	S, C and D	Metals & Thermit Company
Buffalo	None	S, C and D	Vulcan Detinning Company
Chicago	None	S, C and D	Metals & Thermit Company
Los Angeles	D	S, C and D	Los Angeles By-Products Company
Dallas	None	S, C and D	Shredded Steel Company
Birmingham	None	S, C and D	Johnston & Jennings Company
Milwaukee	None		Not chosen
Minneapolis	None		Not chosen
St. Louis	None		Not chosen
Worcester-Springfield, Mass.	None		Not chosen
Hartford-New Haven, Conn.	None		Not chosen
Atlanta, Ga.	None		Not chosen
New Orleans	None		Not chosen

D means detinning, S means shredding and C means cleaning.

*—Already under construction.

**—Plant site chosen but construction not started.

In examining, geographically, the new and old plant locations, with their facilities, it appears that the bulk of the capacity for all three operations—shredding, cleaning and detinning, is in the eastern part of the country. Shredding and cleaning operations, those that prepare the can for detinning, curiously enough, are not always together. Heretofore, it has been customary to clean the can prior to shredding but there are several shredding plants to be constructed that have no other facilities.

Consequently, indications are that shredding will be accomplished before cleaning, and the shredded stock in its unclean state will be shipped to cleaning plants for subsequent cleaning operations. When unclean cans, with part of their contents as well as their labels, are handled in this manner, it would seem that an unnecessary load would be thrown on the already tightened freight facilities of the nation.

There is, however, the possibil-

ity of compulsory cleaning of the cans by the user and this, of course, would simplify greatly the problem, since shredding plants could take the cleaned stock, shred it and send it directly to detinning plants. Then the cleaning plant capacity could be utilized in cleaning up already accumulated stocks of dirty cans and tin scrap.

All considered, the program fairly well blankets the entire United States, with the exception of the western section from the

Rockies east to the Mississippi River. The heavy can goods consuming areas of the east and southeast, as well as the Los Angeles area, will feed the new plants with necessary scrap materials for substantial recoveries of both tin and lead solder, as well as the sheet steel used in can manufacture.

Molybdenite Deposit In Canada Announced

• • • George C. Bateman, Canadian metals controller, confirmed the opening up of a large newly-discovered deposit of molybdenite in Canada at meetings on Oct. 22 of officials of the Combined Raw Materials Board and the Materials Coordinating Committee of the United States and Canada. The deposit was located about 400 miles northwest of the city of Quebec in Preissac Township, Que., by a leading Canadian mining concern. Drilling so far indicates that the deposit is at least 400 ft. long and 200 ft. deep and averages 30 ft. wide.

Domestic Manganese Ores Under Price Ceiling Nov. 9

• • • Domestic manganese ores are under a price ceiling effective Nov. 9. The regulation, No. 248, was announced Oct. 26.

Maximum prices for all domestic sales of manganese ore of every kind, other than domestic battery or chemical ores, to any private buyer, will be as follows:

1. For metallurgical manganese ores of a base analysis of manganese 48 per cent, iron 6 per cent, silica plus alumina 11 per cent and phosphorus not over 0.18 per cent on a dry basis, the following are maximum prices per gross ton unit (22.4 lb.) of contained manganese, duty, if any, paid:

85c. f.o.b. railroad cars Mobile and New Orleans;

90c. f.o.b. railroad cars Norfolk, Baltimore, Philadelphia, and New York;

96c. f.o.b. railroad cars Fontana, Pueblo, and Provo.

Premiums and penalties for variations in content of manganese and other components from the foregoing base analysis are provided. The basing point to be used in determining the maximum price for a particular sale of metallurgical ore shall be the buyer's most favorable basing point.

2. For battery and chemical manganese ores, other than domestic battery and chemical ores, maximum prices shall be:

(1) The highest price which the seller charged for the same kind or grade of ore delivered by him to a purchaser of the same class during March, 1942; or

(2) If the seller did not deliver such kind of grade during March, 1942, the maximum price shall be the highest price quoted in the seller's price list, or, if he had no price list, the highest price which the seller regularly quoted in any other manner, for delivery of such kind and grade of ore to a purchaser of the same class during March, 1942; or

(3) If the maximum price for the kind or grade of ore cannot be determined under the foregoing provisions, the maximum price shall be a price approved by OPA.

In the case of battery and chemical manganese ores imported since March 31, provision is made for adjustments in price to compensate for increased importing expenses.

Exempted from the regulation's pricing provisions are the following:

1. Sales of domestic battery or chemical manganese ores.

2. Sales or deliveries of manganese ores to the United States, or its agencies, including the MRC.

3. Sales or deliveries of manganese ores which are located outside the continental United States. This means that the regulation's pricing provisions do not apply where ore is bought f.o.b. a foreign mine or port. However, OPA will grant no relief on end-product prices by reason of ore costs resulting from such foreign purchases, which are in excess of the delivered cost for a domestic purchase.

Maximum prices for standard ferro-manganese of \$135 per gross ton f.o.b. Atlantic seaboard, with f.o.b. furnace prices for two southern producers, were established May 1 in Maximum Price Regulation No. 138.

The new order provides the following premiums:

Manganese content above 48 per cent: $\frac{1}{2}$ c. for each 1 per cent.

Iron content below 6 per cent: $\frac{1}{2}$ c. for each 1 per cent.

Silica plus alumina content below 11 per cent: nothing.

Phosphorus below 0.18 per cent: nothing.

PENALTIES

Manganese content.
Below 48 per cent: 1c. for each 1 per cent down to and including 44 per cent.

Below 44 per cent: 4c., plus $1\frac{1}{2}$ c. for each 1 per cent down to and including 40 per cent.

Below 40 per cent: 10c., plus 2c. for each 1 per cent down to and including 35 per cent.

Iron content.
Above 6 per cent: 1c. for each 1 per cent up to and including 8 per cent.

Above 8 per cent: 2c. plus $\frac{3}{4}$ c. for each 1 per cent.

Silica plus alumina content.
Above 11 per cent: 1c. for each 1 per cent up to and including 15 per cent.

Above 15 per cent: 4c. plus $\frac{3}{4}$ c. for each 1 per cent.

Phosphorus content.

PRE-INSPECTED FORGINGS

REACH THE
ASSEMBLY LINE SOONER

One purpose of inspection is to lessen the time it takes for forgings to get onto the assembly line. T & W inspectors are trained to practice an unwavering enforcement of fixed standards controlling the uniformity of physical structure, and the size, shape and surface finish of forgings. This thoroughness is practically a pre-inspection from your standpoint and makes possible a reduction of your checking detail which, in turn, avoids delay and cuts your expense of checking to a minimum. It is such thoroughness that merits the term "pre-inspected" and leads to the betterment of

production techniques and steps up the production and finishing of forgings. Ask your T & W Forging Engineer about pre-inspected forgings.



FORGINGS

USUALLY COST LESS
AT THE POINT OF
ASSEMBLY

TRANSUE & WILLIAMS
STEEL FORGING CORPORATION
ALLIANCE, OHIO

Sales Offices: New York, Philadelphia, Chicago, Indianapolis, Detroit and Cleveland

Above 0.18 per cent; 1/3c. for each 0.01 per cent.

The above premiums and penalties shall be applied pro rata to variations of a fraction of 1 per cent.

The basing point to be used in the determination of the maximum price for particular lots of metallurgical manganese ore shall be the buyer's most favorable basing point.

Schedule 71 Revised

••• An adjustable pricing provision—a standard feature of many major OPA regulations—has been written into Revised Price Schedule No. 71 on primary and secondary cadmium. Sellers of cadmium, as a result, may use adjustable pricing contracts which provide that if OPA should increase maximum prices, contract prices may be adjusted upward to ceiling levels in effect at the time of delivery. This authorization is contained in Amendment No. 2 to Schedule No. 71, and becomes effective Oct. 26.

Maximum Prices Set Back for Gray Iron Castings by OPA

••• Price maximums for gray iron castings, which have been governed by the General Maximum Price Regulation, are now set back farther under Price Order 244, issued Oct. 22 and effective Oct. 26. The new regulation sets as ceiling prices for each seller:

1. The highest price at which he sold or offered for sale the same or substantially the same casting between Aug. 1, 1941, and Feb. 1, 1942; or

2. If he did not sell or offer for sale during that period the casting to be priced, he may compute the maximum price by applying the pricing formula and cost factors which he used on Feb. 1, 1942.

In computing prices of castings not sold or offered for sale in the base period, producers are directed to use Feb. 1, 1942, direct labor rates, direct material costs, overhead rates and profit margins. A single exception from the Feb. 1, 1942, base computation date for pricing factors is subcontracted machinery service costs. In calculating a maximum price for a casting on which machining is performed by an outside machine shop, a producer may use the actual price paid for such machining services, not to exceed the maximum price thereof established by OPA. Permission to use such prices is given since OPA has established maximum prices for such machining services at March, 1942, levels.

The gray iron castings industry, which produced close to \$500,000,000 worth of castings last year, is

made up of 3,000 gray iron foundries. Of these, about 1,000 are captive foundries producing castings solely for their own use in the manufacture of some other product. The maximum prices in Regulation No. 244 are applicable only to castings sold commercially.

A feature of Regulation No. 244 is the procedure for processing applications for exceptions from the established maximum prices. This procedure has been for the most part decentralized so that decisions may be made by OPA Regional Offices; also, the information which an applicant is required to file is specified in forms which will be made available.

The filing of certain reports is required. These include:

1. Each person selling gray iron castings must file with his regional office of OPA by Nov. 25 three copies of his published price lists in effect between Aug. 1, 1941, and Feb. 1, 1942, together with a statement of his customary extras, discounts, and allowances in effect during the period. In case he had no such list or customary extras, discounts and allowances, he must file a sworn statement to that effect with the regional office.

2. Each person selling gray iron castings must file with his OPA regional office by Dec. 25, three copies of a form OPA will supply to him on which he is to list his wage rates, overhead rates, cost of materials, profit margins and pricing methods in effect at each of his foundries on Feb. 1, 1942.

3. When a seller first computes a maximum price for a casting for which he has no previous production experience, he must compute such price using his best estimates of the number of man-hours of labor, amount of defectives, quantities of materials and other costs in accordance with the regulation's pricing procedure. However, on subsequent contracts of sale, he must recompute his maximum price using the number of man-hours of labor, amount of defectives, kinds and quantities of materials, and other costs actually required or incurred in production of the casting. Whenever a seller recomputes a maximum price which is higher than the maximum price earlier estimated, he is to file a report of it with the OPA regional office giving (1) a description of the casting, (2) the maximum price prior to the price increase, (3) the new maximum price, and (4) an explanation of the higher price. After sufficient production experience has been gained to enable the seller to compute the costs of the casting with reasonable accuracy, further recomputation is not necessary.

Financial Report Simplified

••• Simplification in the reporting forms by which 25,000 companies voluntarily file financial reports quarterly with the OPA was announced Oct. 21.

The most important change eliminates the requirement that a company report individual salaries for its officers and for employees receiving \$20,000 a year or over. Instead there are substituted simple tabulation of these salaries, omitting reports on salaries of particular individuals.

Another change in the financial

report forms, which will take effect on Jan. 1, 1943, will be a provision in the profit and loss schedule for reporting separately charges which are set up to provide wartime reserves.

Agencies Get Price Powers

••• Governmental agencies exercising regulatory power over prices subject to OPA control were authorized Oct. 20 to file petitions for amendment of OPA regulations. The authority is contained in Amendment No. 3 to Procedural Regulation No. 1 effective Oct. 20. It applies both to federal and state agencies such as the Interstate Commerce Commission and state commissions regulating transportation rates.

Brass Mill Scrap Defined

••• Broadening of the definition of brass mill scrap for price control purposes was announced Oct. 23 by the OPA.

Previously, brass mill scrap was defined as non-ferrous scrap materials which are a by-product of the fabrication of materials produced by brass mills. This definition now has been extended to embrace unused sheet, rod, tube or other brass mill products sold to a brass mill for remelting.

The definition is broadened in Amendment No. 3 to Revised Price Schedule No. 12 (Brass Mill Scrap), which becomes effective Oct. 29.

In another change in the schedule, the amendment creates dollars-and-cents maximum prices for an additional grade of brass mill scrap identified as "tinned copper." Ceiling prices established for tinned copper are 9½¢. per lb. for heavy scrap, sheet, tube, rod and rod ends, and 9¢. per lb. for turnings.

Electrode Maker Assisted

••• Champion Rivet Co. has been granted a price exception by OPA under Price Regulation 136 in regard to sales of electrodes which are now being consigned to a West Coast purchaser. Under contract agreement these articles had been shipped at lower rates prevailing in a water-rail route. Relief provided by OPA permits the company to add freight in excess of \$1 and the present cost for each 100 lb. shipped to this West Coast account.

New Plan to Speed Flow of Materials Being Prepared

• • • A new plan for controlling materials was being prepared at Washington this week, scheduled for announcement Nov. 2. Apparently it would abolish some of the controls now being used and would be based upon bills of actual requirements needed for a specific job, followed by allocations.

Washington officials declined to reveal just what the change would embrace, fearing possible last minute revisions. It was learned, however, that the name of the proposed new method will be "Controlled Materials Plan" and that it embodies features of the material scheduling plan which has been under examination for some time.

Undoubtedly, some time would be required for any major change in priorities to become an accomplished fact. Thus, firms operating under the various controls now extant should continue to file reports and applications without regard to any possible future changes in the broad setup.

The need for a better method of controlling steel and other vital materials has long been recognized. Producers of items of first war importance have suffered critical shortages, while excess inventories have piled up elsewhere and makers of secondary items have often been able to obtain material on high ratings to replace inventory.

Limits Set in Car Wheels And Reinforcing Steel

• • • National emergency specifications for steel products, designed to limit the manufacture of steel mill products to the minimum number of varieties which will satisfy current needs, were established by WPB Oct. 23 in Limitation Order L-211.

The first two such schedules, issued concurrently with the order, cover concrete reinforcement steel, and railroad and transit service wheels and tires. Several other schedules are now being prepared.

The schedule on concrete reinforcement steel (Schedule 1) establishes a list of permissible sizes of steel reinforcing bars by adopt-

ing the Simplified Practice Recommendation R26-42 of the National Bureau of Standards as modified in accordance with recommendations of a technical advisory committee. A list of permissible sizes of steel reinforcing spirals, as set forth in Simplified Practice Recommendation R53-32, is also established.

The schedule on railroad and transit service wheels and tires (Schedule 2) provides for establishment of standard sizes, effective in 60 days. The standards have been accepted and issued in specification form by the Association of American Railroads, the American Society for Testing Materials and the American Transit Engineering Association. The schedule reduces the permissible number of sizes for railroad service alone from 500 to 50.

Drum Makers Aided

Washington

• • • Manufacturers allowed to pack products in steel drums owned by them, as provided by Order L-197, last week were given an extension to Nov. 7 to acquire title to a supply of used drums. The latest amendment (No. 2) was necessary, WPB said, because some manufacturers were accustomed to selling their used containers and then repurchasing them as they needed them instead of retaining title as the order requires.

Superseded Equipment

Washington

• • • An interpretation of the phrase, "equipment of a superseded type," as applied to telephone and telegraph equipment in Preference Rating Order P-130 was issued last Saturday by WPB. The phrase was employed in subparagraph (a) (7) (i) of the order. According to the interpretation, telephone and telegraph equipment is of a "superseded type," if it is usable in its present state of repair by the operator in a practical manner in his existing plant, and is (a) no longer manufactured

or carried by the manufacturer as a regular item for sale, or (b) of such a character that were it not for present or anticipated service requirements, the operator would not place it back into service. The interpretation will enable operators to determine clearly what items of equipment they are authorized to deduct from the dollar value of the inventory report required by P-130.

Blackplate Limits Eased

Washington

• • • Previously restricted to products listed in Tin Conservation Order M-81, limitations on the use of chemically-treated blackplate established by Order M-136 were removed last Friday by the WPB Director General for Operations. An amendment (No. 1) to M-136 makes it clear that treated blackplate can be used interchangeably with ordinary blackplate for packing any of the products listed in the order. Other changes affected by the amendment are:

1. To provide an increased blackplate quota for packing lye, the order now permits use of blackplate up to 100 per cent of the 1941 pack.
2. Added to the list of permitted uses for blackplate containers are packing hardened edible oils, hardened or unhardened lard, rendered pork fat and edible tallow including animal, vegetable and marine blends. These must be packed in 45 lb. cans.
3. Permissible sizes for packing printing, duplicating and lithographing inks are made more specific.

Kitchenware Order

Washington

• • • Issued last Friday, WPB's Supplementary Order L-30-c to Order L-30 cuts the types of cast iron kitchenware that may be manufactured from about 200 different items to approximately 12. The order cuts in half the amount of iron which may be used in production of some of these items, reduces iron consumption in other products 75 per cent and eliminates some types of cast iron kitchenware altogether.

Stoker Order Amended

Washington

• • • WPB has placed production and delivery of industrial-type stokers under a simplified scheduling program in order to facilitate conversion of industrial heating and power plants from oil to

coal. Doing away with the previous requirements of an A-10 or higher rating, WPB has adopted a procedure under which industrial plants will apply to the Director General for Operations for authorization to purchase stokers. This authorization when submitted to the manufacturer will constitute permission to make and deliver the stoker specified.

The new procedure, instituted through Order L-75 as amended, establishes these requirements:

Persons desiring to purchase an industrial-type stoker, having a grate area of 36 sq. ft. or less and handling boilers from 300 hp. down, must file application for WPB authorization on Form PD-668. When authorization is granted, such orders will be considered "rated orders" as defined by Priorities Regulation No. 1. This provision is effective immediately.

On or before Nov. 4, every manufacturer must file a production and delivery schedule with the WPB Plumbing and Heating Branch. This schedule must contain the following information: List of unfilled orders received on or before Nov. 4; a description of each stoker on order (including feeding capacity in pounds per hour and extent of completion); date of each delivery, and name and address of person ordering the stoker, together with any preference rating applied to the order.

Manufacturers are prohibited from postponing the delivery date specified on the schedule without WPB authorization. Also, the Director General for Operations can revoke or modify an authorization for purchase of a stoker any time before delivery. Deliveries to the Army, Navy, Maritime Commission and the War Shipping Administration are exempt from provisions of the amended order until Nov. 23.

Farm Equipment Industry Concentrated by Order L-170

Washington

• • • The long awaited farm machinery and equipment concentration order L-170 was issued by WPB last Tuesday. Practically all production was transferred to small and intermediate sized manufacturing units. The big companies whose sales amounted to more than \$10,000,000 during 1941 have been converted to war production to a great degree.

For example, the manufacture of potato planters was concentrated in the intermediate and small plants with production quota percentages based on the entire production weight of the planters made during 1940 or 1941. Intermediate companies whose 1941 sales were between \$750,000 and \$10,000,000 are to produce 16 per cent with small companies or those whose sales fell below \$750,000 to produce 75 per cent. Differing quotas have been established for various items. The entire United States output of new machinery will be held to 20 per cent of 1940 production while repair parts will be allowed 130 per cent of that year's production.

Production of repair parts is on an over-all basis, the base being the total dollar value of the average annual sales of all repair parts during 1940 and 1941. The dollar

value basis, instead of weight basis, is used because manufacturers keep their records on a basis of dollar value.

It is estimated that the new order will save approximately 500,000 tons of steel and other critical metals. A quota for each item of farm machinery has been determined upon the basis of WPB rationing. To insure the production of such quotas, the WPB Director General is authorized to transfer quotas from one producer to another.

Restrictions were placed on export in terms of total weight of all items, including repair parts, and apply to certain groups of countries, except Canada which remains on a unit basis. In addition, no manufacturer can produce anything for export until an export license has been procured from the Board of Economic Warfare, or on an order approved under Lend-Lease authority.

The quotas established cover only 75 per cent of the material rationed by the industry for 1943 production. The remainder will be distributed later by WPB with inventories, labor supply and the correction of inequities in mind.

A recent determination of the WPB Requirements Committee authorizes priority ratings up to AA-2X for production of repair parts and up to AA-3 for new machinery. In line with this determination, the new order provides that manufacturers may schedule their production as though purchase orders from farmers or dealers bore an AA-3 rating.

Restrictions in the order do not apply to any producer whose quota will be less than \$10,000, in terms of anticipated net sales in 1943. No one who did not produce in 1940 or 1941 is permitted to manufacture farm equipment, except to an amount of not more than \$2,500, and then only if he can obtain the material without priority assistance. Farm machinery or equipment completely manufactured for domestic sale before Oct. 31 may be sold any time after that date without deducting it from quotas established by the new order. However, the equipment manufactured must have been permitted under the provisions of L-26. Equipment made for export before Oct. 31 must be deducted unless the manufacturer has received an

DESERT HOWITZER: Men of the Medium Battalion, Royal Artillery are shown removing a camouflage net from a 155 mm. howitzer used in recent Western Desert warfare. The gun, originally designed in France is now being made in the U. S. A.

British-Combine Photo



export license or lend-lease order, dated prior to Nov. 1, covering the particular items.

No distributor of farm equipment can hold in his inventory over 30 days any used items which cannot be reconditioned. After 30 days all such items must be disposed of through regular scrap channels. Excess inventories of material necessary for the production of farm equipment may be sold by one producer to another. The disposition of such material is provided for under Priorities Regulation No. 13. Supplementary Orders L-26-a, applying restrictions on rubber tires and L-26-d, insuring that farm equipment items get into the hands of farmers, are included in the present order.

Construction Curbed

Washington

• • • Eight governmental agencies were notified last week by WPB Chairman Donald M. Nelson that he had given instructions to revoke priority assistance to a large part of non-military construction for the Federal Government. Simultaneously willful violators of the provisions of Conservation Order L-41, rigidly controlling all civilian construction, were warned by WPB that they will be summarily turned over to the Department of Justice for criminal prosecution.

Exceptions to instructions to revoke priority assistance for government non-military construction were made only insofar as such construction is essential to the war effort. A review of all military projects of the Army, Navy and Maritime Commission, with the same end in view, is being made.

"As things now stand," Mr. Nelson said, "facilities and construction, including many projects not related to the war effort, programmed for 1943, with the carry-over of uncompleted 1942 projects will absorb between one-fifth and one-fourth of the total war effort.

"As a result," he continued, "the aggregate demand of such projects for materials, labor, transportation, manpower and technical and engineering services is so great as not only to jeopardize the various military and essential civilian production programs in general, but to force the most essential war

projects dangerously behind schedule."

The contemplated construction program for 1942 and 1943—including building, equipment and machinery—is estimated at approximately \$33,800,000,000. Of this amount about \$17,800,000,000 is scheduled for completion in 1942, with about \$16,000,000,000 contemplated for 1943. It is in the latter volume that most of the reductions ordered by Mr. Nelson must be made. In the first eight months of this year about \$11,000,000,000 of construction was completed. The volume in August, the latest month for which figures are complete, was \$1,800,000,000—an annual rate of nearly \$22,000,000,000.

House Trailers Restricted

Washington

• • • Production and sale of house trailers are placed under drastic restrictions by Order L-205, issued last week by the WPB Director General for Operations. The order restricts the number of "mobile housing units" (trailers) which may be produced by any one manufacturer to a maximum of 150 in any calendar month beginning Nov. 1, and also restricts production during the remainder of October to the same number. Effective Oct. 27, house trailers may be produced only to fill orders placed or authorized by the National Housing Agency. No trailer produced after Oct. 27 may contain more than 275 lb. of iron and steel except in running gear and movable furniture and equipment, or more than 3 lb. of copper. Trailers constructed after that date are likewise restricted to a maximum interior body length of 22 ft. 6 in., and specifications must be approved by NHA or a person authorized by NHA to purchase a trailer.

"Expansible mobile houses" constructed after Oct. 27 are similarly restricted to 310 lb. of iron and steel, 5 lb. of copper and also must be built according to NHA approved specifications. This type of trailer can be expanded when stationary to provide extra space. Mobile housing units produced or assembled after Oct. 27 may be sold or delivered only to NHA or persons authorized by NHA. Provisions of the order are effective

regardless of any existing contract, agreement, or preference rating. The order is expected to save 3000 tons of critical metals annually.

Substitution Ordered

Washington

• • • Substitution of non-metallic materials in the manufacture of reflectors for fluorescent lighting fixtures, as a means to conserve steel, will be required throughout the industry beginning Oct. 31, according to an amendment to Order L-78, issued by WPB on Oct. 19.

PD-25-F Users Warned

Washington

• • • Firms working under PRP for fourth-quarter may appeal for additional material on Form PD-25F, but are warned that only applications covering material necessary to the war effort or for essential civilian uses can be considered. A separate PD-25F must be filed for each class of product covered by the authorization on PD-25A. A covering letter must explain in detail the purpose for which additional material is requested, indicating whether it is for use or receipt, and whether an appeal is being made for permission to divert quantities already authorized for use in one product to the production of another.

Liquidation Sales Covered

• • • WPB orders controlling the delivery and acceptance of scarce materials apply to liquidation sales of all kinds, it is made clear in Interpretation No. 1 to Priorities Regulation No. 1, issued Oct. 20. "Special sales," as defined in Priorities Regulation No. 13, may be made in liquidation proceedings, but only in accordance with the conditions established by that regulation.

Shovel Makers Aided

• • • Shovel manufacturers who had in their possession before Aug. 10 inventories of raw and partly processed steel in shapes and sizes not usable under Schedule I of Limitation Order L-157 are permitted to continue fabri-

cation of this material. Under amendment No. 3 issued Oct. 20.

Control Over X-Ray Equipment

• • • Strict control over the production and sale of X-ray equipment has been established with issuance of Limitation Order L-206. The order prohibits the manufacture of any models or types of X-ray equipment other than those listed in Schedule A, attached to the order. The sale, transfer or delivery of X-ray equipment is prohibited except to the Army, Navy, Maritime Commission and the War Shipping Administration, or to other persons who establish their need on Form PD-556.

X-ray tubes, accessories, parts for maintenance and repair, and X-ray consumable supplies are excluded.

PD-200B Now in Use

• • • The new form PD-200B must be used after Oct. 26 for all applications for amendments to construction projects authorized by a preference rating order of the P-19 series. The form is available at FHA and WPB field offices. It should be used for requests for a higher rating and for items not previously authorized or for increases in quantities previously authorized. After Oct. 26, it was emphasized, requests for project amendments will not be accepted on PD-1A forms or by letter.

Distressed Stocks Unit Moves

• • • The Distressed Stocks Unit of the Iron and Steel Branch has been transferred to Pittsburgh, where it will work with representatives of the Steel Recovery Corp. and the Materials Redistribution Branch in speeding the purchase and allocation of frozen, idle or excess stocks of iron and steel. The Distressed Stocks Unit will direct the allocation of material which the government decides to purchase. Responsibility for locating idle iron and steel, for establishing prices at which it will be purchased by the government, and for requisitioning, is assigned to the Materials Redistribution Branch. The Steel Recovery Corp. arranges for inspection, supplies shipping direc-

tions, handles payments for government purchase stocks, and bills purchasers on behalf of the Metals Reserve Co. Headquarters of the WPB Pittsburgh Unit are at 5835 Baum Boulevard. Steel Recovery Corp. and Materials Distribution Branch representatives are also located there.

Use of Tinplate Hit

• • • Use of tinplate in packing pyrethrum and rotenone base insecticides is prohibited by an amendment to the tin conservation order (M-81) issued Oct. 20. Packers of these products can substitute blackplate or glass for the previously used tinplate containers.

The amendment is No. 4 and also makes changes in the order as it pertains to cans for apples, applesauce and sausage. A provision for disposition of used cans to detinning plants is deleted from the order to bring it into conformity with M-72-a, which covers disposition of used tin cans.

L-57 Widened

• • • The definition of an "anti-gas device" is extended to cover any equipment purporting to protect civilians against enemy gas attacks in Amendment No. 1 to Limitation Order L-57, announced Oct. 21.

Rules on Container Costs

• • • Acting to encourage the substitution of cheaper containers to replace steel and other critical materials no longer available for packaging numerous chemicals, the OPA last week informed the chemical industry that, except in special and unusual cases, upward adjustment of ceiling prices to permit producers to pass on to purchasers increases in container costs would not be authorized. OPA will adjust the maximum prices of individual chemical manufacturers suffering "substantial hardship" due to increases in packaging costs, but these adjustments will not be permitted unless the concern conclusively shows that it is unable to effect economies in container costs by use of cheaper materials, OPA officials asserted.

Tire Chain Output Cut

Washington

• • • Production of tire chains, chain parts and emergency chain units has been limited to 16 per cent of all passenger car and commercial vehicle chains that were manufactured in the year ended March 31, 1942. This action was taken last Saturday through Order L-201. For commercial vehicles production of chains, parts and emergency chain units was limited to 24 per cent of all passenger cars and commercial vehicles manufactured during the same period.

A simplification provision in the order reduces the number of types of chains that may be produced and carried in stock by dealers.

M-72-a Amended

• • • Wisconsin has been added to the states in which municipalities of 25,000 or over must collect and keep segregated all prepared tin cans, by Amendment No. 1 to Order M-72-a.

Cleaners Frozen

• • • Stocks of all types of new domestic vacuum cleaners in the hands of manufacturers, wholesalers and retail dealers were frozen Oct. 24 until Jan. 1, 1943. The action (Supplementary Order L-18-c) completely prohibits sales of vacuum cleaners to anyone but the Army, Navy, Lend-Lease and holders of export licenses issued by the Board of Economic Warfare.

Car Materials Freed

Washington

• • • To clear up a misunderstanding that might exist in the trade, OPA on Tuesday issued Amendment No. 1 to Maximum Price Regulation No. 174 clearly excluding from this regulation sales by car builders to railroads of partially or wholly fabricated parts used for repair and maintenance. The amendment will become effective Nov. 2. This regulation covers freight car materials sold by car builders. OPA said that maximum prices for repair and maintenance parts are to be determined under Maximum Price Regulation No. 136, covering machines and parts and machinery services.

This Week's Priorities and Prices

Form PD-200B must be used after Oct. 26 for applications for amendments to construction projects authorized by a preference rating order of the P-19 series. (T-1048)

Automotive equipment, such as hoists, cranes, winches, tanks, bodies, etc., are considered "parts" for the purpose of General Order ODT 21, according to interpretation 21-1 issued Oct. 15. (PM-4046)

Tin can scrap collected by collectors operating under contract with municipalities must be segregated under amendment to order L-72-a. (WPB-2028)

Aluminum scrap conversion toll fees are limited to differential between maximum price of aluminum scrap and ceiling price of converted aluminum under Amendment 3 to RPS 2. (OPA-T-208)

Farm machinery prices are set at March 31, 1942, levels by Maximum Price Regulation No. 246 issued Oct. 22. (OPA-T-209)

Gray iron castings prices have been set at Feb. 1, 1942,

levels under Maximum Price Regulation No. 244 effective Oct. 26. (OPA-T-204)

Smelters and refiners are given a preference rating of AA-2X for delivery of materials for maintenance and repairs under Amendment No. 2 to Order P-73. (T-1038)

Tinned copper has been put into the general brass mill scrap category by Amendment No. 3 to Revised Price Schedule No. 12, issued Oct. 23, 1942. (OPA-T-213)

National Emergency specifications for steel products were established by WPB in Order L-211, issued Oct. 23. (T-1071)

■ ■ ■

For copies of above announcements address Office of War Information Washington, giving announcement number as shown in parentheses after each paragraph. (For example, WPB-600 means announcement 600 issued by the War Production Board.)

Revisions to The Iron Age Priorities Guide

• • • The following data, together with all intermediate weekly revisions in **THE IRON AGE**, should be added to **THE IRON AGE Priorities Guide** published with the issue of October 8 to bring the Guide up to date.

"M" Orders:

M-43...Amendment No. 1 (10-19-42) permits users of dental foil and electrotypers' foil to buy such foil with a preference rating of A-10.

M-63...Amendment No. 7 (10-19-42) adds to lists of materials covered by order to become effective Oct. 21.

M-72-a...Amendment requires use of trash collection machinery in scrap drive.

M-81...Amendment No. 4 (10-20-42) prohibits use of tinplate in packing certain insecticides.

M-115...Amendment No. 1 to amended order (10-22-42) permits purchase of kits containing shaving cream or toothpaste tubes for members of armed forces without turning in an old tube.

M-136...Amendment No. 1 (10-23-42) removes limitations on use of chemically-treated blackplate.

M-239...Restricts uses of steatite tale.

"P" Orders:

P-58...Amendment No. 1 (10-19-42) gives preference rating of AA-2X to South American copper producers for purchase of 35 per cent of their maintenance and repair materials requirements in any six-month period.

P-73...Amendment No. 2 (10-19-42) gives smelters and refiners preference rating AA-2X for delivery of materials for maintenance and repairs.

PD Forms (correction):

PD-226 rev....Report of copper scrap producer.

PD-391...Alloy Steel Melting Schedule.

"L" Orders:

L-18-c...Supplementary order (10-24-42) prohibits sales of vacuum

cleaners to anyone but the Army, Navy, Lend-Lease and holders of export licenses issued by the Board of Economic Warfare.

L-26...Revoked (10-19-42).

L-26-a...Revoked (10-19-42).

L-26-d...Revoked (10-19-42).

L-28...Amendment (10-24-42) orders cut in production of photo-flash and photoflood bulbs.

L-57...Amendment No. 1 extends definition of anti-gas device.

L-30-c...Supplementary order (10-23-42) orders simplification in production of kitchenware.

L-72-a...Amendment (10-19-42) requires trash collectors operating under contract with municipalities for collection of scrap to segregate tin can scrap which has been prepared.

L-75...Amended order places production and delivery of industrial-type stokers under a simplified scheduling program (10-20-42).

L-78...Amended order requires substitution of non-metallic materials in the manufacture of reflectors for fluorescent lighting fixtures (10-20-42).

L-157...Amendment No. 3 (10-20-42) permits shovel manufacturers who had raw and partly processed steel in shape and sizes not usable under Schedule No. 1 to continue fabrication of this material.

L-170...Cuts production quotas on farm machinery by approximately 50 per cent (10-20-42).

L-197...Amendment No. 2 (10-23-42) allows an extension to Nov. 7 to manufacturers to acquire title to a supply of used steel drums for packing their products.

L-201...Order limits production of tire chains, chain parts and emergency chain units (10-24-42).

L-206...Places strict control over production and sale of X-ray equipment (10-21-42).

L-211...Establishes national emergency specifications for steel products (reinforcing steel and railroad wheels).

L-214...Provides basic pattern for control of production and simplification of medical equipment and supplies (10-24-42).

*These forms were erroneously marked obsolete in the Oct. 8 issue of the Guide.

Great Western Mfg. Co. Dissolves After 84 Years

• • • The Great Western Mfg. Co., Leavenworth, Kans., maker of sifting and screening machines, is quitting business after 84 years of continuous operation. Ernest C. Schroeder, milling engineer for the old company, and J. E. Baker, secretary for the past 21 years, have bought at public auction the equipment, patents and records and have formed a new company called Great Western Mfg. Co., Not Inc., Leavenworth. Combs Gyratory riddles was not included in the sale.

J. & L. Wins Safety Awards Pittsburgh

• • • In recognition of a perfect safety record for 1941, nine "Certificates of Honor" have been awarded the Pittsburgh and Aliquippa Works of the Jones & Laughlin Steel Corp. by the Pennsylvania Department of Labor and Industry.

In addition, both of the above works received "Certificates of Merit" for 1941 in recognition of a safety record better than the State average as did 80 individual departments in the plants.

Dr. Nelson Returns To WPB Mining Branch

Washington

• • • Dr. Wilbur A. Nelson has resumed his duties as Administrator of the WPB Mining Branch. He has been serving recently as a special assistant on certain mining problems to A. I. Henderson, Deputy Director General for Industry Operations. Dr. Marcellus Stow, who served as acting administrator during this period, will resume his duties as assistant administrator of the Mining Branch.

New 56-Page Priorities Guide

Brings Demand for Extra Copies

• • • Publication of the Seventh Priorities Guide in a recent issue of *THE IRON AGE* brought a deluge of orders for extra copies. Here are a few comments on the 56-page book which lists all M, L and P orders and PD forms and gives much additional information:

"The Seventh Edition of the Guide has been and will be very helpful."
"We noted with considerable interest the Seventh Edition of the Priorities Guide. We have found this very valuable."

"The Guide is certainly very complete and helpful. We would like two additional copies."

"We found your Guide very helpful and shall appreciate receiving extra copies by return mail."

Prices of extra copies of this brand new compilation, answering thousands of questions on the confusing subject are: One to ten copies, 50c. each; 11 to 100 copies, 40c. each; 101 to 300 copies, 35c. each, and 300 or more copies, 30c. each. Write, telegraph or telephone *THE IRON AGE*, 100 E. 42nd St., New York.

Full Scale, Re-designed Sea Otter to Be Built

Washington

• • • Lend-Lease Administrator E. R. Stettinius, Jr., announced last Thursday that the contract for construction of the first full-scale Seamobile had been let by Cargoes, Inc., to the United States Shipbuilding Corp., Yonkers, N. Y. Cargoes, Inc., is the instrumentality through which the Office of Lend-Lease Administration is carrying on the development of the Seamobile, or re-designed Sea Otter. The experimental Seamobile will be about the same size as the Sea Otter II. The most important change is that the propellers will be moved to the stern.

"The directors of Cargoes, Inc., advised me," Mr. Stettinius said, "that the contract calls for completion of the vessel within 90

days after delivery of the structural steel for the hull. When the vessel has been completed and thoroughly tested, we will know whether more Seamobiles ought to be built or not. Our aim is to give this novel type of vessel every fair chance to prove its worth."

Youngstown Reports Third Quarter Earnings

• • • The Youngstown Sheet and Tube Co. reported a third quarter net earning of \$2,459,652, bringing its total earnings for the nine months' period to \$7,327,350. This compares with 1941 earnings of \$2,576,579 in the first quarter, \$2,291,119 for the second quarter and \$3,103,649 for the September quarter. Total earnings for the nine months' period of 1941 were \$7,971,347.

U. S. Steel Reports Third Quarter Earnings

• • • Net income of U. S. Steel Corp. for the third quarter of 1942 amounted to \$12,628,836 after providing for estimated taxes and after deduction of wage and salary adjustments during the third quarter amounting to \$14,600,000. No provision has been made for wage adjustment for some ten subsidiaries whose cases are still pending before the War Labor Board.

Directors declared a quarterly dividend of \$1.75 on the preferred stock and a dividend of \$1 per share on common stock, the latter payable Dec. 19, to stockholders of record Nov. 20.

Net income for nine months of 1942 was \$46,495,743; in the third quarter of 1941 net income was \$34,313,345. Shipments of finished steel at 5,257,969 net tons during third quarter of 1942 showed an increase of 3.4 per cent over the third quarter of 1941.

Fire Damages New Wright Engine Plant

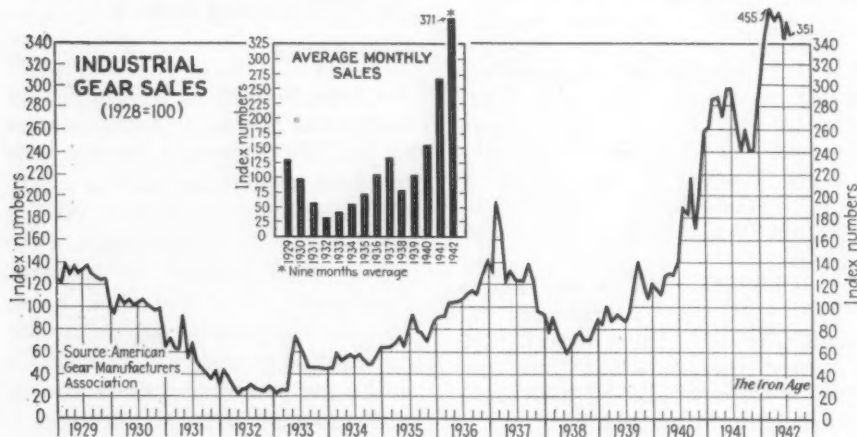
Cincinnati

• • • The new engine plant of Wright Aeronautical Corp. in suburban Lockland was damaged on Oct. 25 by a fire of unknown origin which started in a basement portion of the structure.

Production at the plant was not imperiled but large quantities of cafeteria equipment and some air conditioning apparatus were destroyed. The loss was placed at about \$30,000 by Fire Marshal Cunningham. Only damage to the building was said to be fire-cracks in the concrete of the fireproof construction.

Industrial Gear Sales Declined in September

• • • Sales of industrial gears during the month of September dropped 8 per cent below the August figure, according to the American Gear Manufacturers Association. The September figure is 44 per cent above the corresponding month of 1941. For the nine months of 1942 sales were 34.2 per cent higher than they were in the same period last year.



Trade Notes . . .

Richard S. Schultz and Associates have changed their name to Methods for Industrial Relations, Inc., 22 East 40th Street, New York.

Cochrane Corp., Philadelphia, has appointed Energy Control Co., Philadelphia, its representative for flow meters, Hays combustion control and instruments and Heacon damper in eastern Pennsylvania, southern New Jersey, Delaware and Maryland.

Grobet File Co. of America, New York, distributor of Swiss Pattern and rotary files, has moved to 421 Canal Street.

March Engineering Co., a new firm organized to manufacture ordnance parts, has purchased the property of the J. I. Case Co. at Oshkosh, Wis., which will be remodeled and equipped to begin operations about Nov. 15. Capt. H. A. Thordike is president of the March company and will be in charge of plant operations.

The Iron Age Critical Tool Locating Chart

Compiled from latest WPB data on available machine tool capacity.

CRITICAL TOOLS	REGIONAL OFFICES—WAR PRODUCTION BOARD											
	Total	No. 1 Boston	No. 2 New York	No. 3 Phila- delphia	No. 4 Atlanta	No. 5 Cleveland	No. 6 Chicago	No. 7 Kansas City	No. 8 Dallas	No. 10 San Francisco	No. 11 Detroit	No. 12 Minne- apolis
BORING												
Horizontal—3" Bar	53,115	7,378	12,744	6,305		10,527	7,873	1,104	2,123	692	3,385	984
" —To 4" Bar and Over	57,032	5,540	6,830	9,126		18,064	7,915	3,630	1,845	746	1,981	1,355
Vertical—54"	35,828	4,081	4,977	4,942		8,622	4,025	3,602	2,273	318	781	2,307
" —To 84"	49,683	4,269	6,337	8,288		14,279	5,159	3,812	3,530	1,268	1,083	1,658
" —To 120"	16,569	1,615	2,602	2,457		5,456	1,848	1,159	244		696	492
" —Over 120"	6,451		1,513	1,381		1,785	1,053	356	197			168
Jig Borers	29,747	7,769	6,848	2,697		4,606	3,915	655	158	588	2,398	113
Misc. Precision—Heald—Ex-Cell-O type	20,057	1,618	973	1,329		8,270	4,279	1,350	474	740	790	234
BROACHING	67,707	14,910	9,600	4,696		15,257	12,672	2,341	934	632	4,840	1,825
DRILLING												
Radial 6' to 8' Radius	73,754	6,677	14,249	11,960		22,093	6,901	4,789	3,072	136	2,128	1,740
Over 8' Radius	4,209	138	853	1,186		392	96	432	977		175	60
DUPLICATING AND PROFILING	29,974	10,932	7,248	2,935		3,754	3,118	635			1,214	138
FORGING												
Drop—Hammer—Board 100 lb. up	127,309	38,950	41,651	9,573		22,462	11,803	936	762	168	204	800
Steam 5000 lb. up	9,596	2,471	1,181	559		2,757	583	945			712	388
Press—Forging—Steam Hydr. 500 ton	7,353	748	3,434	200		1,647	950	314			60	
GEAR CUTTING												
Gear Hobbers—48" and up	20,247	2,512	1,294	2,750		6,384	2,235	1,831	1,023		1,378	840
Bevel Gear Cutters	51,806	11,789	5,004	7,532		13,451	6,127	1,983	496	504	4,596	324
GRINDERS												
Centerless	36,442	8,557	4,525	3,878		7,381	4,131	2,095	72	461	5,126	216
External Cyl.	395,846	98,011	76,757	37,376		61,207	44,566	26,642	5,761	4,663	29,333	11,530
Internal Cyl.	124,779	25,407	15,940	12,275		22,074	15,420	12,936	5,340	1,692	9,897	3,798
Thread	4,286	929	1,473	736		796	292				60	
LATHES												
Engine—24" Dia.—Over 60" c.-c.	216,780	30,420	37,418	26,990		49,166	22,505	14,576	15,073	3,248	6,860	8,524
" —Over 24" Dia.—To 60" c.-c.	87,584	15,057	20,700	9,887		14,564	8,904	9,124	2,485	1,334	2,509	3,020
" —Over 24" Dia.—To 96" c.-c.	137,098	18,016	25,684	15,903		32,177	11,743	15,532	8,603	2,240	3,473	3,727
" —Over 24" Dia.—Over 96" c.-c.	333,034	45,869	45,067	54,126		72,211	30,120	32,765	29,776	5,194	10,558	7,348
Turret—12" Dia. 2½" Bar and up	93,180	13,061	23,988	12,955		19,277	10,099	4,918	2,612		3,598	2,672
" —To 24" Dia. 2½" Bar and up	166,159	21,496	26,246	22,379		36,545	14,938	15,905	8,686	5,062	8,718	6,184
" —Over 24" Dia. 2½" Bar and up	39,771	3,217	5,500	6,350		8,323	6,712	4,153	3,048	794	716	958
Automatic—12" Diameter	15,584	2,653	1,831	850		891	6,392	1,074	336	108	1,220	229
" —To 24" Diameter	14,215	1,510	973	336		1,731	998	1,116		486	6,776	289
" —Over 24" Diameter	1,712		192	48		168	1,248					56
SCREW MACHINES												
Automatic—Single 1"	79,203	15,985	23,317	7,935		12,796	8,735	1,846	860		1,946	983
" —Single to 3"	86,969	13,662	18,327	9,254		15,015	13,946	2,898	1,056	653	12,594	564
" —Single—Over 3"	16,568	2,344	1,402	1,967		2,293	6,618	168	108		1,668	
" —Multiple—To ½"	7,045	684	2,502	1,112		534	560				1,653	
" —Multiple—To 1"	91,490	19,673	17,100	9,373		13,164	13,179	4,376	84		14,061	480
" —Multiple—To 3"	65,812	10,720	8,491	8,429		14,570	11,436	6,011		1,697	4,346	112
" —Multiple—Over 3"	4,211	143	108	116		640	2,860				344	
MILLING												
Standard Type—Horizontal—No. 3	219,742	44,754	40,647	22,675		41,894	26,341	14,041	7,328	2,437	12,941	6,684
" —Horizontal—Over No. 3	104,664	14,492	21,190	16,787		21,708	9,862	7,018	4,048	1,782	4,746	3,031
" —Vertical—No. 3	42,302	12,763	7,231	2,885		8,348	5,205	1,452	458		3,621	339
" —Vertical—Over No. 3	44,921	13,818	5,153	6,628		9,207	3,969	1,226	618	261	3,363	678
Mfg.—Horizontal—12" table width	27,005	9,660	4,027	1,125		3,912	4,648	1,146	232	401	1,042	812
" —Horizontal—Over 12" table width	16,434	3,066	2,153	432		4,277	4,336	980	244		739	217
Planer—Over 30" table width—stab mill	8,204	2,040	1,380	902		1,930	456	500			256	740
" —Over 30" table width—side spdl	2,435	511	186	933		185	84	144	128			264
" —Over 30" table width—vert. spdl	6,820	1,442	1,624	869		1,279	286		148		558	614
" —Over 30" table width—side and vert.	6,419	1,784	617	842		2,433	1,918	198		60	441	132
Misc. and Dia. Cutting—Heiler Type	19,090	5,860	5,004	1,404		4,545	1,120	316			844	
PLANERS												
60" wide to 15'	9,956	1,150	1,134	1,829		2,709	1,607	603	704		220	
60" wide, over 15'	4,414	1,098	245	836		903	705	540	706		180	
Over 60" wide to 15'	25,662	336	434	486		586	168	202	37	98	175	228
Over 60" wide, over 15'	7,220	1,004	1,137	1,957		2,081	232	279	94		276	160
THREADERS												
External Mills	2,750	6,483	4,289	3,239		4,010	3,142	964	136	222	2,263	914
Internal Mills	5,213	66	209	305		1,322	1,260	216	976	60		
TOTAL AVAILABLE HOURS	3,233,458	589,128	586,539	386,325		656,555	380,293	215,828	117,665	38,645	183,542	78,938

The available critical tool hours per week here shown are based on an 168-hour week and represent usable tool hours subject to operating labor available. Reports are based on initial inspection of the plants concerned by engineers trained for this work. The War Production Board Field Offices are acting as clearing houses for all public or private contractors or agencies interested in using these facilities.

When making inquiries regarding the availability of these critical tool hours for specific jobs, communicate in detail with the Regional Supervisor, Critical Tools Service, in the WPB Region best located for your job. They are:

Region	Supervisor	Assistant	WPB Office
No. 1 Boston	R. F. Wood	H. H. Whitcomb	17 Court Street
No. 2 New York	J. J. Carroll	C. Philippi	122 E. 42nd Street
No. 3 Philadelphia	C. E. Reinicker	R. V. Hilands	1617 Penn. Blvd.
No. 5 Cleveland	C. J. Perrier	C. R. Griffith	Union Commerce Bldg.
No. 6 Chicago	S. C. Bloom	W. I. Buhl	20 N. Wacker Dr.
No. 7 Kansas City	W. A. Crooks	P. J. Leonard	Mutual Interstate Bldg.
No. 8 Dallas	B. P. Rhineford	W. E. White	4th Fl., Fidelity Bldg.
No. 11 Detroit	R. O. Cunningham	J. B. Shepard	7310 Woodward Avenue
No. 12 Minneapolis	E. H. Pitney		326 Midland Bk. Bldg.

PERSONALS . . .

• **A. E. Shelton**, formerly works manager of the Stinson Division of Vultee Aircraft, Inc., has been promoted to the newly created position of division manager. Mr. Shelton joined the Vultee organization at Wayne, Mich., in February of this year after 12 years with the aircraft industry. He was president and general manager of the Menasco Mfg. Co. in Burbank, Cal., and before that purchasing agent of Lockheed Aircraft and of T.W.A. and Western Airlines.

• **Edward L. Robinson** has been made assistant to the manager of the metallurgical division, Pittsburgh district, Carnegie-Illinois Steel Corp. Mr. Robinson has held the position of assistant chief metallurgist, Irvin Works, for the past two years. He started with the Carnegie Steel Co. in 1933 and from 1935 to 1937 was research engineer at the Westinghouse Electric laboratories. Experience with the Carnegie-Illinois Steel Corp. has covered various plant metallurgical and inspection positions at the Clairton, Farrell, Vandergrift and Irvin plants of the company.

• **H. L. Bodwell** has been appointed by A. Milne & Co., New York, as manager of its Pittsburgh office. Mr. Bodwell had been with the American Sheet & Tin Plate Co. as master mechanic and resident manager from 1901 to 1908. From 1908 to 1935, he was at the Vandergrift plant of American Sheet & Tin Plate as master mechanic, assistant manager and manager. During the period 1935 to 1941, he had been assistant chief engineer of American Sheet & Tin Plate and assistant chief engineer, construction division and engineer, sheets and tin plate, Carnegie-Illinois. Just prior to this present appointment, Mr. Bodwell has been with the Pittsburgh Ordnance District, industrial division.

• **Arthur E. Petzon**, formerly assistant production manager for Curtiss Wright Corp. Airplane Division, Buffalo, has been appointed manager of the company's new modification center nearing completion in Cheektowaga, N. Y. Purpose of the center will be to

make it unnecessary to return to factories planes to be changed on orders of the Army. Supervisory staff appointments include **William G. Lang**, general superintendent; **John Copeland**, chief engineer; **Robert H. Persons**, personnel supervisor; **James Everingham**, inspection supervisor; **V. F. Oehlerich**, military contracts supervisor, and **Martin Johnson**, purchasing supervisor.



A. E. SHELTON, manager, Stinson Division, Vultee Aircraft, Inc.

• **Lawrence E. Riddle**, general superintendent, Isabella furnaces, and superintendent, blast furnaces, Duquesne Works, Carnegie-Illinois Steel Corp., was honored at a luncheon upon the completion of 50 years' service with this U. S. Steel subsidiary. Mr. Riddle entered the employ of the Carnegie Steel Co. on October 1, 1892, as a sample boy in the laboratory of Isabella Furnaces.

• **W. A. Schlegel** of the metallurgical department, the Carpenter Steel Co., Reading, Pa., has been awarded the Henry Marion Howe gold medal by the American Society for Metals, for his technical paper on "Surface Carbon Chemistry and Grain Size of 18-4-1 High Speed Steel". The award was

made at the Cleveland Convention of the society.

• **Thomas H. Corpe** has been named general sales manager of the Elastic Stop Nut Corp., Union, N. J. Mr. Corpe was formerly assistant general sales manager of the Lockheed Aircraft Corp., and at one time was in charge of sales promotion, advertising and market research for that company. Mr. Corpe has also been associated with General Motors Corporation as a technical engineer in charge of its Proving Ground, and in various sales and promotion positions.

• **Merritt L. Smith**, advertising manager of Metal & Thermit Corp., New York, has been appointed assistant sales manager of the corporation. Mr. Smith, who has been with Metal & Thermit for 10 years, was formerly a member of the staff of Rickard & Co., advertising agency. **Charles D. Young**, formerly district manager of Metal & Thermit's Chicago office, has been appointed sales manager of the welding division, New York. Mr. Young has been connected with Metal & Thermit's Chicago branch since its inception in 1912, being made district sales manager in 1926.

• **Bertram S. Stephenson**, president of the Tonawanda Iron Corp., has been appointed a member of the OPA's industry advisory committee on pig iron.

• **William M. Neal**, formerly secretary and assistant treasurer of Sloss-Sheffield Steel & Iron Co., Birmingham, has been elected vice-president and secretary by the company's board of directors. Mr. Neal, who had been a member of the Birmingham law firm of Bradley, Baldwin, All & White, became associated with Sloss-Sheffield in 1940.

• **Elmer Bimberg** has been appointed plant manager of the Zenith Carburetor division of Bendix Aviation Corp. He succeeds **J. T. Black**, who has resigned. Mr. Bimberg has been with Zenith for 26 years. He was chief engineer of the division for the last five years.

• **Franklin D. Colburn** has been elected comptroller and director of American Bridge Co., Pittsburgh, U. S. Steel subsidiary. Mr.

Colburn, since 1922, has been successively assistant treasurer of Fraser, Brace & Co., engineers, contractors and shipbuilders; general auditor of the Hegeman-Harris Co., Inc., building construction; and treasurer and director of the John W. Harris Associates, Inc., New York, building construction.

- **Frank Silloway**, vice-president of Deere & Co., Moline, Ill., has been elected president of the Farm Equipment Institute. Mr. Silloway previously served as chairman of the institute's executive committee.

- **Ralph I. Schuppener** has been elected as vice-president of Bennett Mfg. Co., Chicago. He has been located at Washington for the company for several months in connection with government business.

- **C. A. Reimechissel** of the Landis Machine Co., Waynesboro, Pa., has been appointed a member of the sectional committee on pipe thread of the American Standards Association.

- **F. M. Hoeffler**, former vice-president and general manager of the Harvill Die Casting Corp., Los Angeles, has been appointed president of the company. Warren Stratton, company attorney for many years has been named a director.

- **E. P. Barry**, formerly of Glenn L. Martin Co., Baltimore, has been appointed coordinator of plants for the Chicago Pneumatic Tool Co., New York. Mr. Barry will supervise machine equipment, tool designing and production methods for the four plants of the company located at Detroit, Cleveland, Franklin, Pa., and Garfield, N. J. After serving four years apprenticeship as a tool and die maker and gaining practical experience with various concerns, he joined the Glenn L. Martin Co., in 1922, where he remained until recently. During his 20 years in airplane manufacturing he fulfilled many key positions and was serving in the capacity of plant and equipment engineer at the time of his resignation.

- **H. P. Binder**, assistant manager of the hydraulic department in charge of centrifugal pump sales and engineering at the Allis-Chalmers Mfg. Co., Milwaukee, has been named manager of the com-

pany's centrifugal pump department. He joined the Allis-Chalmers' student training course in 1911. In 1912 he took charge of the company's first hydraulic test pit and in 1919 entered the hydraulic department as its first sales engineer.

- **H. J. Mandernach** has been appointed sales manager of the replacement tube section of General Electric's radio, television and electronics department, at Bridgeport, Conn. Mr. Mandernach joined G.E. in 1936 and became district radio representative in the mid-west, with headquarters in Chicago. He held that position until early this year when he was assigned to the G-E radio headquarters staff.

- **William J. Simpson**, a graduate engineer of Pennsylvania State College, and for several years design engineer for Baldwin Locomotive Works, Baldwin-Southwark Corp., and Brill Car Co., has joined the engineering staff of Milton Roy Pumps, Philadelphia, manufacturer of chemical, high-pressure and controlled-volume pumps.

- **George E. Whitlock**, president the Mullins Mfg. Corp., Warren, Ohio, and **A. E. Walker**, president the National Supply Co., Pittsburgh, were elected to the board of directors of the American Welding & Mfg. Co. of Warren.

- **Guy Fiber** of Detroit and **L. E. Detrick** of Chicago have been employed by the Timken-Detroit Axle Company as field representatives to work with operators of motor vehicles, their mechanics and drivers, in improving maintenance practices and driving habits. Mr. Detrick, who will have headquarters at 2519 West Winnemac Avenue, Chicago, will cover territory that includes Illinois, Wisconsin, Minnesota and Indiana. **H. A. Mitchell** was recently transferred from this territory to the West Coast. Mr. Fiber will cover Michigan, Ohio, West Virginia and parts of Pennsylvania, with headquarters at 22422 Six Mile Road, Detroit.

Alex Walker Appointed Assistant to H. G. Batcheller Washington

- • • **Alex Walker**, president of the National Supply Co., Pittsburgh, has been appointed as special assistant to WPB Iron and Steel Branch Chief H. G. Batcheller.

OBITUARY...

- **Daniel A. Keating**, plant superintendent of the Stanley Works and inventor of numerous auto, household and other accessories, died Oct. 21, aged 73 years. Mr. Keating learned his trade from his father at the Eaton, Cole & Burnham factory, now Jenkins Brothers. He left to go to the Cylindograph company. In 1893 he became assistant foreman of the tool room. Two years later he became foreman of the machine shop, and in 1903 was promoted to chief engineer of the plant. The company was purchased in 1926 by the Stanley Works.

- **John C. Carr**, superintendent of employment at the Pittsburgh works of Jones & Laughlin Steel Corp., Pittsburgh, died recently, aged 62 years. Mr. Carr spent practically all of his steel experience with Jones & Laughlin and was well known in personnel circles.

- **Arthur P. Taylor**, president of Charles Taylor Sons Co., Cincinnati, died last week. He was 68 years old. Mr. Taylor was a former head of the American Refractories Institute.

- **Loy T. LeBow**, president, Joplin Machinery & Electric Co., Joplin, Mo., died Oct. 9.

- **Walter H. Shackton**, Wisconsin district manager for the Allen-Bradley Co., Milwaukee, died Oct. 19. A graduate of the University of Wisconsin, he was a member of the American Institute of Electrical Engineers and the Milwaukee Engineering society.

- **Carl W. Blossom**, president of the Hobby Machine Co., Cleveland, died Oct. 14.

- **Edward C. McKenna**, proprietor of the Edward C. McKenna Co., Detroit industrial diamond firm, and president of the Angle-Set Tool Co., died in a Detroit hospital Oct. 14.

- **Ora A. Montgomery** who in 1937 organized the Partool Machine Co., died recently.

NON-FERROUS METALS

... Market Activities and Price Trends

Copper Wage Increases Make Quota Revision Likely

••• With copper output depending on labor supply, and labor supply actually depending on wages in spite of attempts at other control, the subject of higher subsidies through quota revisions is likely. Production above quotas calls for the payment of 5c. a lb. premium over the regular 12c. a lb. price but copper producers complain that in many instances quotas have been set so high that it is impossible to exceed them. At the time the quotas were first established, there was no shortage of labor, and operating costs were lower than at present.

The reduction of quotas is not a new expedient. About 200 revisions have been made during the February-September period. Actual quota figures are kept very secret, not only from the public but from other copper producers.

Although output of the open-pit mines has increased slightly in re-

cent months, production from underground mines has steadily declined. It is believed that if plenty of labor were available, production could be raised several thousand tons a month. Although the Army recently announced that 4000 miners will be furloughed to return to the mines, it is doubted in the industry whether anything like that number will really be involved. For one thing, the furlough is voluntary.

A curious wage increase has been granted 10,000 copper, lead and zinc miners in Idaho and Utah. Half of the increase, or 50c. a day, is given every payday; on every fourth payday the remaining 50c. a day is paid to those miners who have met standards of work continuity and output. This increase and 2½c. to 12½c. an hr. increases for 4000 other workers will be partly met by the government to the extent of about \$3,000,000 a year in the case of the lead and zinc mines, and another \$6,000,000 a year for the copper mines, accord-

ing to Leon Henderson of the OPA.

In Canada, drops in copper output have resulted in the government taking control of the Britannia Mining & Smelting Co. at Howe Sound and the Granby Consolidated Mining Co. at Copper Mountain. The Howe Sound mine has a daily rated capacity of 4700 tons of ore but recently has been treating only 2200 tons a day. Normally the mine employs 1070 men, but the recent payroll has been 481. Granby, with 800 men and a capacity of 5000 tons daily normally, has 693 men and an output of 4200 tons.

Virgin tin in the hands of 300 Canadian owners is being purchased for the government stockpile. Purchases are beginning with the 15 per cent held by 300 owners. Eight companies hold 85 per cent.

Vanadium shortage is worrying Canada. The government is working on a possible method of recovering the metal from open hearth slag at Dominion Iron & Steel Corp., since the Newfoundland ores used by this company yield a little vanadium. The ash residues from oil-burning ships are also being collected for recovery of their vanadium content. The United States, Peru and Northern Rhodesia continue to be important vanadium sources, but shipping difficulties and increased demand have brought on the Canadian shortage.

Zinc and aluminum are to be supplanted in the off-set printing industry, according to WPB report which says that lithographing plates from processed paper and plastics will soon be available for 3000 commercial lithographing plants.

Recovery of secondary lead, a source which yielded 380,000 tons in 1941, will decrease as the war progresses, according to the WPB. The 1942 supply from this source will be only about 90 per cent of 1941, the 1943 supply only about 75 per cent of 1941. Automobile batteries were the main contributor. The WPB report goes on to recommend that lead be substituted for copper, tin and zinc wherever possible, but warns that "substitution is the thing, not just consumption."

AFTER-BRIDGE-GAME DINNERS: The New York housewife who spends the afternoon at the bridge table and serves dinner straight from the can is serving the nation in at least one direction as illustrated by these New York department of sanitation trucks dumping tin can collections into a barge for transportation to a New Jersey de-tinning plant. Since March the department has collected 8641 tons of cans which yielded over 70 tons of precious tin.



Draft Boards May Tap Key Executives in Industry

Cincinnati

••• Draft problems continue to increase for district machine tool builders. Several manufacturers indicate that men easily placed in the indispensable class, such as engineers, top flight executives and similar employees, are receiving new questionnaires and physical examination orders, thus arousing the strong possibility that these men will be taken into the army. While draft boards have heretofore been highly cooperative in preserving machine tool plant forces, efforts to keep essential men in the industry in the face of the diminishing draft pool is becoming harder almost daily. Of course, the situation has not yet become so critical as to affect production, but the problem is now most disturbing.

Little or no change in the other general picture of the market is noted currently. Materials are still not flowing satisfactorily, but despite the "headaches" in obtaining requirements management so far has been able to keep materials and production in line.

WPB Approves \$26 Million Plant Addition for Kaiser

Washington

••• With WPB approval announced last Saturday by Chairman Donald M. Nelson, the Kaiser Co., Inc., has been given the go-ahead signal for a \$26,000,000 addition to steel plant facilities being built at Fontana, Calif. With the increased units authorized the company will have an annual ingot capacity of 675,000 tons. The expansion has been recommended by WPB for RFC financing.

The new facilities include two 185-ton open hearth furnaces; a 28-in. structural mill; a merchant bar mill; alloy finishing facilities and slow cooling pits for ingots.

The additional open hearth furnaces will have an annual capacity of 225,000 tons of ingots while the four open hearth furnaces now under construction have a 450,000-ton capacity. Other units being built include a 1200-ton blast furnace and a 110-in. plate mill. The facilities under construction are scheduled for completion during the first quarter of 1943, according to WPB.

War Department Approves Five Construction Projects

••• The War Department announced on Oct. 23 the following construction authorizations:

Air Force installation at Congaree, S. C., to cost in excess of \$2,000,000. Contracts have been awarded to M. B. Kahn Construction Co., Columbia, S. C.; Boyle Construction Co. and Davis Moragne, Sumter, S. C.; Warren Bros. Roads Co., Cambridge, Mass.; Reed and Abee Inc., Asheville, N. C.; E. T. Gullledge, Wedge Field, S. C. Construction will be supervised by the Charleston district office of the Corps of Engineers.

Air Force installation in Florence County, S. C., to cost in excess of \$1,000,000. Work will be supervised by the Charleston district office of the Corps of Engineers.

Air Force installation at Topeka, Kans., to cost in excess of \$3,000,000. Construction will be supervised by the Kansas City district office of the Corps of Engineers.

Expansion of Camp Campbell, Ky., to cost in excess of \$3,000,000. Construction will be supervised by the Nashville, Tenn., district office of the Corps of Engineers.

Air Force installation at Madras, Ore., to cost in excess of \$2,000,000. Construction will be supervised by the Portland, Ore., district office of the Corps of Engineers.

U. S. Stocks Ore; Consumption 6,933,602 Tons in September

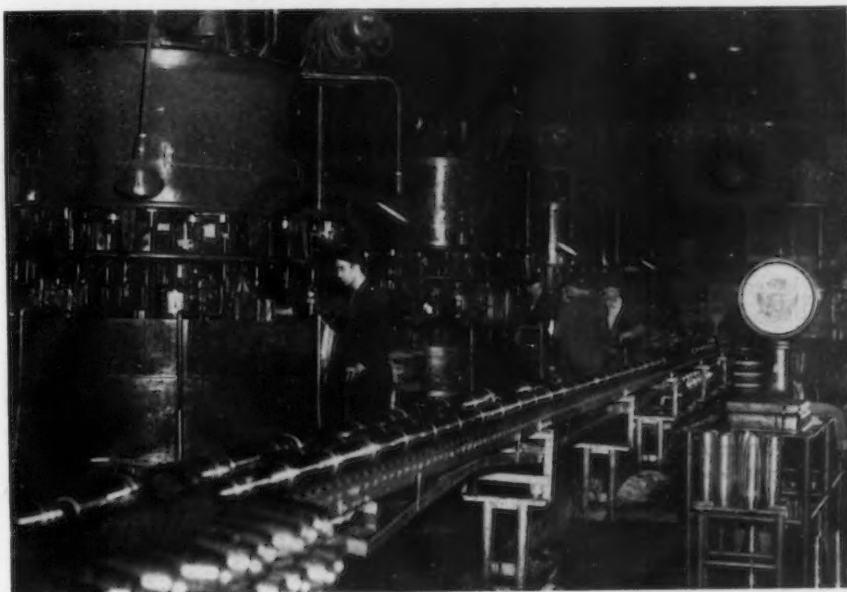
Cleveland

••• Consumption of Lake Superior ore during September by American blast furnaces totaled 6,933,602 gross tons and by Canadian furnaces, 206,286 gross tons, making a total ore consumption for United States and Canada for the month of 7,139,888 gross tons as compared to total consumption during August of 7,155,202 gross tons. For the year to date consumption of iron ore in the United States amounted to 61,575,518 gross tons as against 54,971,529 tons consumed in the same period of 1941.

Ore stocks at both furnaces and American docks on Lake Erie were increased substantially during the past month. At American and Canadian furnaces stocks amounted to 42,547,864 gross tons, and on Lake Erie docks the stocks totaled 5,873,741 tons. Total stocks on Oct. 1 were 48,421,605 gross tons as compared to stocks of 43,236,172 tons a month ago and 40,770,029 a year ago.

During September two more furnaces were in blast than during the previous month with 172 in blast in the United States and nine in Canada. During August there were 170 in blast in the United States and nine in Canada.

SHELLS IN THE MAKING: Here a steady stream of shells flows along a conveyor in the National Tube Co., a subsidiary of the U. S. Steel Corp. The corporation is deeply involved not only in making steel for the war program but in turning out armament of many kinds ranging from 17 lb. fragmentation bombs to 2-ton demolition bombs and from strip for cartridge clips to tank and ship armor.



SCRAP

... Market Activities and Quotation Trends

Collections Show Gain; Steel Output Rises

••• **Steel ingot tonnage** scheduled for a new record this week is a significant reflection of the success of recent scrap drives. Household scrap is beginning to reach mills in larger volume while at the same time reports indicate that the flow of industrial scrap is up sharply.

From Sept. 20 to Oct. 20 some areas succeeded in doubling their industrial collections. Since then further impetus has been provided by the thousands of salesmen volunteers calling on manufacturing firms for dormant materials. In a report Monday of this week, John J. Hill, Jr., national chairman of the American Steel Warehouse Association drive, told directors of the Association that early reports from salesmen support the WPB contention that vast tonnages of scrap lie unused in 250,000 industrial plants of America.

Despite the labor shortage in scrap yards and other difficulties, household scrap is being sorted, cut and shipped in larger quantities now. Some steel companies have pitched in to handle the material directly. At New York, Bethlehem Steel Co. has agreed to take larger daily quantities of the public's salvage than the dealers are able to handle. In other parts of the nation, assistance from the general public is proving valuable in getting the material to mills.

Prices paid for the household material promise to enrich service men's funds by large amounts. At Cleveland around \$13.50 per ton was paid; at Detroit \$10-\$11 per ton; at Philadelphia \$11.50, and at New York around \$4.50 per ton.

Practically all mills now are using as much scrap as their open hearths can take and are not holding back any for winter supplies except that amount over and above their maximum requirements.

In some key consuming areas, there is fear that severe winter conditions may affect scrap collections drastically, but probably the greatest worry is over what will happen after non-recurrent scrap has been fully exploited.

In the industrial scrap drive,

early reports by A. A. Ziegler of Morris Wheeler & Co., chairman of the Philadelphia steel warehouse chapter drive, show a lumber yard giving 10 tons, a vegetable oil firm 35 tons, two small sheet metal companies 26 tons, an iron repair firm 7 tons, and an electric power equipment firm 4 tons, including a 35-ft. stack which the head of the firm agreed to cut down.

Dealer Finds 10% of Public Scrap Is Waste

Detroit

••• **Charges** of mismanagement and profiteering in the Wayne County Salvage Committee Drive for voluntary scrap donations were declared baseless in a report filed by a three-man investigating panel appointed by the Wayne County Council of Defense. It was said that the \$11 price obtained for scrap rather than being unreasonably low, as charged, was "substantially in excess of the fair market value."

A detailed analysis of costs involved in the salvage operation was presented. One scrap dealer bought 770 tons of salvage material at \$10 a ton, the price orig-

inally agreed upon before the going rate was raised to \$11. The cost of processing was put at \$6.50 a ton, or \$4,550, making the total outlay by the dealer \$12,250.

Of the material classified 70 tons was outright waste with no value, as was another 70 tons of tin can scrap. The rest of the scrap was sold at these ceiling levels: 376 tons at \$15.32 a ton, or \$5,760; 54 tons at \$19.50 a ton or \$1,053, and 109 tons at \$17.32 a ton or \$1,887. In addition, 21 tons was composed of brass, copper and bronze, which separated, sold for \$90 a ton, or \$1,890.

The total selling price on this transaction, therefore, was \$10,590, representing a loss of \$1,660 on the deal. On this basis the 12,000-odd tons handled by the scrap dealers of Detroit as a result of the voluntary collection drive would have cost them approximately \$28,000 in losses.

The Detroit program has been cited as an exceedingly workable one. The mechanics were as follows: at the very beginning the salvage committee consisted not only of representatives of industry, labor, manufacturers and others, but of scrap dealers as well. When the voluntary drive was set, this group surveyed the city and designated 25 yards of commercial dealers as dumping grounds for the collection. The scrap then went into these yards for sorting and handling through trade channels. Payment at an agreed price of \$10 a ton—later \$11—was made by the dealers to the County Salvage Committee.

C. F. & I. to Reclaim Scrap From 6 Million-Ton Dump

••• **The Colorado Fuel & Iron Co.'s** 6,000,000-ton refuse dump at Pueblo, Colo., is to be explored for scrap steel, beginning next month. It is estimated that the dump, which is two miles long and 100 ft. high, contains 500,000 tons of scrap steel, and an indeterminate amount of other metals. About a million tons of refuse will be handled a year in the reclaiming operations. All the steel recovered will be used by C. F. & I.



Drawn for Office of War Information

KID SALVAGE

Truck Drivers Greatly Assist Cleveland Drive

Cleveland

••• A patriotic gesture in the scrap drive in Cuyahoga County came from truckers and helpers who volunteered their services. With some 1500 trucks averaging better than two loads each, scrap moved in a continual stream to yards all day.

Early in the drive, it was discovered that scrap yards didn't have nearly enough help to handle the volume of material that was moving in. Drivers and helpers not only loaded the trucks, but also unloaded them at the yards. Scrap yard men were quite liberal with their praise of the help they received.

Dealers paid \$13.08 a ton delivered at their yards for the scrap collected on the scrap drive. In addition, the brokers donated their usual 50 cents-a-ton commission. This money was turned over to the Civilian Defense Corps of Cleveland. In the suburban communities the local civilian defense headquarters got the money. Schools which collected quantities of scrap received the money for their own use. Does this completely answer your question.

While it will be from 30 to 60 days before any substantial flow of scrap from the drive will be felt by the mills, Service Director David said that the 50,000-ton estimate was quite conservative.

The scrap collected was sent to some 21 yards in the area, and the excess was piled on the lake front for future distribution to yards as they cleaned up present supplies. Some of the larger yards that received substantial quantities of the collected material were:

Lederer Iron & Steel Co. . . .	1,166,950 lb.
Reliable Salvage & Maintenance Co.	1,727,590 "
Cohen & Sons	751,590 "
Atlas Steel & Supply Co. . .	505,000 "
By Product Iron & Steel Co. .	188,000 "

PHILADELPHIA — Shipments in this area have been reported as noticeably better for the past two weeks and have continued to improve this week. Most dealers and mills attribute this to recent local scrap drives. While the quantities are better, there has been a decided drop in the quality and some dealers are accused of trying to ship improperly prepared household scrap. This is believed to be the exception rather than the rule. Industrial scrap is reported about the same as usual and no change is seen in railroad scrap.

CHICAGO—The supply situation here is much better than it has been for some time, but is still far from being completely satisfactory, particularly in view of the winter months ahead. Most steel plants here have been able to add slightly to their reserves over the past few weeks, but none yet has an inventory large enough to carry through the winter. Some quarters have expressed the fear that there may be a letdown in collections.

PITTSBURGH—The enthusiasm exhibited in public scrap drives which has resulted in the better flow of material has likewise been noted in the returns from industrial concerns which have also become more scrap conscious. As a result, scrap dealers have noticed a better flow of scrap from normal sources in addition to the scrap being received from household drives. Higher operations here reflect the increased amount of available scrap.

ST. LOUIS—Shortage of labor is proving a serious matter in the handling of scrap in dealers' yards, which are being swamped with material collected in the campaign, which is going over in a big way. Collections are widely varied, and trucking facilities which have been increased considerably through voluntary action, are still inadequate.

BUFFALO—Bethlehem Steel Co. has begun salvaging metal from its 25 to 30-year-old slag dumps in Lackawanna. About 1000 tons a month are being reclaimed now, but this tonnage will increase as salvage operations are stepped up, a company spokesman said. The

dumps are extensive enough to keep "mining" operations going for at least a year, probably longer. Meanwhile, dealers' yards here still are plugged up with scrap collected in the recent drive. Most of this is moving out as No. 2 bundles.

CLEVELAND—Mill scrap stocks in this area are not a bit comfortable when it is considered that cold weather will settle within the next month or so. One producer has a stock sufficient for about one month's operations, while others have stocks ranging down to a week and just a few days. One large producer has been continually requesting Washington for allocations so that at least a small inventory can be built up. Valley stocks average about two weeks' supply per mill.

CINCINNATI—While civic drives have presented many problems in sorting and grading old materials, dealers acknowledge that these patriotic campaigns have proved that there is enough scrap available to meet needs for quite a long war. In this area, dealers report there is a good supply of material and consumers are being supplied in reasonably good shape. The recent amendment to Schedule 4 of the price list is reported to be working well to the benefit of the trade in its work of getting the scrap moving.

BIRMINGHAM — The difficulties involved in grading and preparing the material that has been collected in the newspaper-sponsored drive continue as a major scrap problem here.

SECOND LAP: The journey of this Berlin bound aerial bomb of World War I was canceled by the Armistice. Shown starting on the second lap of its journey via the scrap pile, the memento is being given impetus by E. J. Kulas, vice-chairman of Jones & Laughlin Steel Corp. and president of the Midland Steel Products Co. After melting in the open hearths at the J&L Otis Works, the bomb will unquestionably again be headed Berlin-wise.



SCRAP PRICES

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES

(All Prices Are Per Gross Ton)

	BASIC OPEN HEARTH GRADES (No. 1 Heavy Melting; No. 1 Hydr. Com- pressed Black Sheets; No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)		BLAST FURNACE GRADES (Mixed Borings and Turnings; No. 2 Busheling; Cast Iron Borings)		Bar Crops, Punch- ings Plate Scrap and Cast Steel		3 ft. and Under		2 ft. and Under		1 ft. and Under		3 ft. and Under		2 ft. and Under		1 ft. and Under and Auto, Springs, and Crank- shafts		Alloy free Low Phos. and Sulphur Turnings		Heavy Axle and Forge Turn. First Cut		Electric Furnace Bundles	
	Unbaled* Machine Shop Turnings																							
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton,	\$ 20.00	\$16.00	\$16.00	\$17.50	\$25.00	\$22.50	\$21.00	\$21.50	\$22.00	\$20.00	\$20.50	\$21.00	\$18.00	\$19.50	\$21.00									
Cleveland, Middletown, Cincinnati, Portsmouth,	19.50	15.50	15.50	17.00	24.50	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50									
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Pt....	18.75	14.75	14.75	16.25	23.75	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75									
Ashland, Ky.	19.50	15.50	15.50	17.00	24.50	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50									
Buffalo, N. Y.	19.25	15.25	15.25	16.75	24.25	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25									
Bethlehem, Pa.; Kokomo, Ind., Duluth, Minn.	18.25	14.25	14.25	15.75	23.25	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25									
Detroit, Mich.	18.00	14.00	14.00	15.50	23.00	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00									
Toledo, Ohio.	17.85	13.85	13.85	15.35	22.85	20.35	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85									
St. Louis, Mo.	17.50	13.50	13.50	15.00	22.50	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50									
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	13.00	13.00	14.50	22.00	19.50	16.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00									
Minnequa, Colo.	16.50	12.50	12.50	14.00	21.50	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50									
Seattle, Wash.	14.50	10.50	10.50	12.00	19.50	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50									

*Baled turnings are \$4 per gross ton higher. Dealers may charge \$2 per ton for crushing other than heavy turnings. An industrial producer may charge \$1.

BUNDLES: Tin can bundles are \$4 below dealers' No. 2 bundles; No. 3 bundles are \$2 less than No. 1 heavy melting.

SWITCHING CHARGES: Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, 36c.; Conshohocken, 11c.; Atlanta, Birmingham, 32c.; Pittsburgh, Cal., 42c.; Middletown, 14c.; Sparrow's Point, 11c.; Chicago, 84c.; Detroit, 53c.; Alabama City, 26c.; Minnequa, 22c.; Seattle, 38c.. *At Cincinnati, for basic open hearth grades, cut auto scrap and auto springs and crankshafts, deduct 80c. per ton.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. Dock charge is 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published

dock charges prevail. If unpublished include 75c.* For exceptions see official order.

AT NEW YORK city or Brooklyn, the maximum shipping point price is \$15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is \$15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of \$6.66 per ton.

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be \$2.50 (and in the case of the material from which No. 1, No. 2, and No. 3 bundles are made \$4) less the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge \$2.50 per ton on consumer-owned unprepared remote scrap (see order). A preparation-in-transit charge for allocated unprepared scrap is provided.

Maximum price of all scrap in a vehicle is that of the lowest price grade in the shipment. This limitation does not apply to vessel shipments if grades are segregated.

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed. For special preparation charges, consult official order.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1 per cent oil), \$1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), \$2 less than No. 1 heavy melting. If loaded in box cars add 75c.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of \$2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA.

*At Memphis 50c.; Great Lakes ports \$1; New England \$1.25.

RAILROAD SCRAP

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails		
				3 ft. and Under	2 ft. and Under	18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown, Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown, Chicago, Philadelphia, Sparrows Pt., Wilmington, Birmingham, Los Angeles, San Francisco, Buffalo, Detroit, Duluth, Kansas City, Mo., Kokomo, Ind., Seattle, St. Louis.	\$20.50 21.00 19.75 18.00 20.25 18.85 19.00 17.00 19.25 15.50 18.50	\$21.50 22.00 20.75 19.00 21.25 19.85 20.00 18.00 20.25 16.50 19.50	\$23.00 23.50 22.25 20.50 22.75 21.35 21.50 19.50 21.75 18.00 21.00	\$23.50 24.00 22.75 21.00 23.25 21.85 22.00 20.00 22.25 18.50 21.50	\$23.75 24.25 23.00 21.25 23.50 22.10 22.25 20.25 22.50 18.75 21.75	\$24.00 24.50 23.25 21.50 23.75 22.35 22.50 20.50 22.75 19.00 22.00

CAST IRON SCRAP

	Group		
	A	B	C
No. 1 cupola cast.....	\$18.00	\$19.00	\$20.00
No. 1 machinery cast, drop broken, 150 lbs. and under.....	18.00	19.00	20.00
Clean auto cast.....	18.00	19.00	20.00
Unstripped motor blocks.....	17.50	18.50	19.50
Stove Plate.....	17.00	18.00	19.00
Heavy Breakable Cast.....	15.50	16.50	17.50
Charging box size cast.....	17.00	18.00	19.00
Misc. Malleable.....	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B; switch district of Kansas City, Kan., Mo.

Composite Prices

Advances Over Past Week in Heavy Type; Declines in *Italics*.

(Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel:	Oct. 27, 1942	Oct. 20, 1942	Sept. 29, 1942	Oct. 28, 1941
(Cents Per Lb.)				
Hot rolled sheets.....	2.10	2.10	2.10	2.10
Cold rolled sheets.....	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip.....	2.10	2.10	2.10	2.10
Cold rolled strip.....	2.80	2.80	2.80	2.80
Plates.....	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terne Plate:	Oct. 27, 1942	Oct. 20, 1942	Sept. 29, 1942	Oct. 28, 1941
(Dollars Per Base Box)				
Tin plate.....	\$5.00	\$5.00	\$5.00	\$5.00
Special coated mfg. ternes	4.30	4.30	4.30	4.30

Bars and Shapes:	Oct. 27, 1942	Oct. 20, 1942	Sept. 29, 1942	Oct. 28, 1941
(Cents Per Lb.)				
Merchant bars.....	2.15	2.15	2.15	2.15
Cold finished bars.....	2.65	2.65	2.65	2.65
Alloy bars.....	2.70	2.70	2.70	2.70
Structural shapes.....	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00

Wire and Wire Products:	Oct. 27, 1942	Oct. 20, 1942	Sept. 29, 1942	Oct. 28, 1941
(Cents Per Lb.)				
Plain wire.....	2.60	2.60	2.60	2.60
Wire nails.....	2.55	2.55	2.55	2.55

Rails:	Oct. 27, 1942	Oct. 20, 1942	Sept. 29, 1942	Oct. 28, 1941
(Dollars Per Gross Ton)				
Heavy rails.....	\$40.00	\$40.00	\$40.00	\$40.00
Light rails.....	40.00	40.00	40.00	40.00

Semi-Finished Steel:	Oct. 27, 1942	Oct. 20, 1942	Sept. 29, 1942	Oct. 28, 1941
(Dollars Per Gross Ton)				
Rerolling billets.....	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars.....	34.00	34.00	34.00	34.00
Slabs.....	34.00	34.00	34.00	34.00
Forging billets.....	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

Wire Rods and Skelp:	Oct. 27, 1942	Oct. 20, 1942	Sept. 29, 1942	Oct. 28, 1941
(Cents Per Lb.)				
Wire rods.....	2.00	2.00	2.00	2.00
Skelp (grvd).....	1.90	1.90	1.90	1.90

Pig Iron:	Oct. 27, 1942	Oct. 20, 1942	Sept. 29, 1942	Oct. 28, 1941
(Per Gross Ton)				
No. 2 fdy., Philadelphia..	\$25.89	\$25.89	\$25.89	\$25.84
No. 2, Valley furnace...	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti....	24.68	24.68	24.68	24.06
No. 2, Birmingham.....	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa...	25.39	25.39	25.39	25.34
Basic, Valley furnace...	23.50	23.50	23.50	23.50
Malleable, Chicago†....	24.00	24.00	24.00	24.00
Malleable, Valley.....	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago..	31.34	31.34	31.34	31.34
Ferromanganese†.....	135.00	135.00	135.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap:	Oct. 27, 1942	Oct. 20, 1942	Sept. 29, 1942	Oct. 28, 1941
(Per Gross Ton)				
Heavy melting steel, P'gh.	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	23.00
No. 1 cast, Pittsburgh...	20.00	20.00	20.00	22.00
No. 1 cast, Philadelphia.	20.00	20.00	20.00	24.00
No. 1 cast, Ch'go.....	20.00	20.00	20.00	20.00

Coke, Connellsville:	Oct. 27, 1942	Oct. 20, 1942	Sept. 29, 1942	Oct. 28, 1941
(Per Net Ton at Oven)				
Furnace coke, prompt...	\$6.00	\$6.00	\$6.00	\$6.125
Foundry coke, prompt...	6.875	6.875	6.875	6.875

Non-Ferrous Metals:	Oct. 27, 1942	Oct. 20, 1942	Sept. 29, 1942	Oct. 28, 1941
(Cents per Lb. to Large Buyers)				
Copper, electro., Conn...	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis.....	8.25	8.25	8.25	8.25
Lead, St. Louis.....	6.35	6.35	6.35	5.70
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 108 to 116 herein.

Comparison of Prices

FINISHED STEEL		PIG IRON		SCRAP STEEL	
Oct. 27, 1942.....	2.30467c. a Lb.....	23.61 a Gross Ton.....	\$19.17 a Gross Ton.....	23.61 a Gross Ton.....	\$19.17 a Gross Ton.....
One week ago.....	2.30467c. a Lb.....	23.61 a Gross Ton.....	\$19.17 a Gross Ton.....	23.61 a Gross Ton.....	\$19.17 a Gross Ton.....
One month ago.....	2.30467c. a Lb.....	23.61 a Gross Ton.....	\$19.17 a Gross Ton.....	23.61 a Gross Ton.....	\$19.17 a Gross Ton.....
One year ago.....	2.30467c. a Lb.....	23.61 a Gross Ton.....	\$19.17 a Gross Ton.....	23.61 a Gross Ton.....	\$19.17 a Gross Ton.....

HIGH		LOW		HIGH		LOW		HIGH		LOW	
1942.....	2.30467c.,	2.30467c.,	2.30467c.,	23.61, Mar. 20	\$23.45, Jan. 2	\$22.00, Jan. 7	\$19.17, Apr. 10	23.61, Mar. 20	\$23.45, Jan. 2	\$22.00, Jan. 7	\$19.17, Apr. 10
1941.....	2.30467c.,	2.30467c.,	2.30467c.,	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1940.....	2.35367c., Jan. 2	2.24107c., Apr. 16	2.24107c., Apr. 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1939.....	2.58414c., Jan. 4	2.27207c., Oct. 18	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1938.....	2.58414c., Mar. 9	2.32263c., Jan. 4	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1937.....	2.32263c., Dec. 28	2.05200c., Mar. 10	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1936.....	2.07642c., Oct. 1	2.06492c., Jan. 8	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1935.....	2.15367c., Apr. 24	1.95757c., Jan. 2	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1934.....	1.95578c., Oct. 3	1.75836c., May 2	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1933.....	1.89196c., July 5	1.83901c., Mar. 1	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1932.....	1.99629c., Jan. 13	1.86586c., Dec. 29	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1931.....	2.25488c., Jan. 7	1.97319c., Dec. 9	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1930.....	2.31773c., May 28	2.26498c., Oct. 29	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point ↓ Product	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars	DELIVERED TO		
													Detroit	New York	Phila- delphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.22¢	2.35¢	2.28¢
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.17¢	3.41¢	3.39¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.75¢	3.68¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.47¢	3.73¢	3.69¢
Long ternes ²	3.80¢		3.80¢									4.55¢		4.18¢	4.14¢
STRIP															
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.22¢	2.48¢	
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.92¢	3.18¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.58¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.07¢	3.33¢	
TIN PLATE															
Standard cokes, base box	\$5.00	\$5.00	\$5.00						\$5.10					5.38¢	5.34¢
BLACK PLATE															
29 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢			1 ² 4.05¢			3.39¢
TERNES, M'FG															
Special coated, base box	\$4.30	\$4.30	\$4.30						\$4.40						
BAR															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.52¢	2.80¢	2.27¢	2.51¢	2.49¢
Rail steel ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.52¢	2.80¢			
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.52¢	2.55¢ ¹⁴	2.27¢	2.40¢	
Reinforcing (rail) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.52¢	2.55¢ ¹⁴	2.27¢		2.49¢
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)					3.01¢	2.99¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massillon, Canton = 2.70¢)					2.82¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.47¢		
(Coatesville and Claymont = 2.10¢)															
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢ ¹¹		2.47¢	2.65¢	2.33¢	2.30¢	2.155¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.72¢	4.00¢		3.73¢	3.69¢
Alloy	3.50¢	2.50¢				(Coatesville = 3.50¢)					3.97¢	4.15¢		3.71¢	3.60¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.47¢	2.75¢		2.28¢	2.22¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢				(Worcester = 3.00¢)							
0.51 to 0.75 Carbon	4.30¢			4.30¢				(Worcester = 4.50¢)							
0.76 to 1.00 Carbon	6.15¢			6.15¢				(Worcester = 6.35¢)							
1.01 to 1.25 Carbon	8.35¢			8.35¢				(Worcester = 8.55¢)							
WIRE⁹															
Bright ¹⁰	2.60¢	2.60¢		2.60¢	2.60¢			(Worcester = 2.70¢)				3.10¢			2.94¢
Galvanized	add proper size extra and galvanized extra to bright wire base, above.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢				(Worcester = 3.30¢)				3.70¢			3.54¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.74¢
IRON BARS¹²															
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

¹ Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to certain width and length limitations. ⁶ For merchant trade. ⁷ Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. ⁸ Also shafting. For quantities of 20,000 to 39,999 lb. ⁹ Carload lot to manufacturing trade. ¹⁰ These prices do not apply if the customary means of transportation (rail and water) are not used. ¹¹ Ship plates only. ¹² Common iron bars quoted at 2.15c. by Terre Haute, Ind., producer. ¹³ Boxed. ¹⁴ Portland and Seattle price, San Francisco price is 2.50c. ¹⁵ This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

GOVERNMENT CEILINGS—Price Schedule No. 6 issued April 16, 1941, governs steel mill prices; Price Schedule No. 49 governs warehouse prices, which are on another page of this issue.

EXCEPTIONS TO PRICE SCHEDULE NO. 6—On hot rolled carbon bars, Phoenix Iron Co. may quote 2.35c. at established basing points; Calumet Steel division of Borg Warner may quote 2.35c., Chicago, on bars from its 8-in. mill; Joslyn Mfg. Co. may quote 2.35c., Chicago base. On rail steel bars Sweets Steel Co. may quote 2.33c., f.o.b. mill. On hot rolled sheets, Andrews Steel Co. may quote for shipment to Detroit area on Middletown base. On galvanized sheets, Andrews Steel may quote 3.75c. at established basing points. On hot rolled strip, Joslyn Mfg. Co. may quote 2.30c., Chicago base. On plates, Granite City Steel Co. may quote 2.35c., f.o.b. mill, and Central Iron & Steel Co. may quote 2.20c., f.o.b. basing points. On shapes, Phoenix Iron Co. may quote 2.30c. established basing points and 2.50c. Phoenixville for export.

On rail steel merchant bars, Eckels-Nye Corp. may charge 2.40c. On tubing, South Chester Tube Co. may price Gulf or Pacific Coast all-rail shipments and shipments west of Harrisburg on basis of f.o.b. Chester. On lend-lease sales to eastern seaboard, Sheffield Steel Co. and Colorado Fuel & Iron Corp. may sell f.o.b. mill. SEMIFINISHED STEEL—Follansbee Steel Corp. may sell forging billets at \$49.50 f.o.b. Toronto; Continental Steel Corp. may sell Acme Steel Co. at \$34 for rerolling billets plus extras and freight; Ford Motor Co. may sell rerolling billets at \$34 f.o.b. Dearborn; Andrews Steel Co. may sell forging billets at \$50 at established basing points and slabs at \$41; Empire Sheet and Tin Plate may sell slabs at \$41 at established basing points and sheet bars at \$39 f.o.b. mill; on lend-lease sales Northwestern Steel & Wire Co. may charge \$41 per gross ton f.o.b. mill for rerolling billets; on lend-lease sales Wheeling Steel Corp. may charge \$36 per ton for small billets, f.o.b. Portsmouth and \$37 per ton for sheet bars f.o.b. Portsmouth; Laclede Steel Co. on semifinished sales for lend-lease shipped to eastern seaboard may use Chicago basing point prices f.o.b. Alton and Madison, Ill. ALLOY STEEL BARS—Texas Steel Co. may use Chicago base f.o.b. Worth.

Proper identification conserves high speed steel



Information supplied by "The Iron Age"

Plants using both tungsten and molybdenum types of high speed steels should give serious consideration to the establishment of an efficient identification system—one that will keep the steels separated from bar stock to finished tool.

The danger of spoilage is particularly acute when mixed lots get into the heat treaters' hands.

The recommended hardening temperatures for tungsten types are 100° to 200°F. higher than those for the molybdenum types. Treating the latter so far

above recommended temperatures will spoil them for cutting tool service. Treating the tungsten types that far below recommended hardening temperatures will not develop the required red hardness.

Heat treaters sometimes use the "sweating" of tungsten types as an indication that the steel is up to proper hardening temperature. *This does not hold with molybdenum types.* In their case a pyrometer should always be used to determine when the steel is at the recommended hardening temperature.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS. MOLYBDIC OXIDE—BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"

Climax Molybdenum Company
500 Fifth Avenue • New York City

PRICES

SEMI-FINISHED STEEL

For exceptions, see preceding page

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2.25 higher; f.o.b. Duluth, billets only, \$2 higher.

	Per Gross Ton
Rerolling	\$34.00
Forging quality	40.00

Shell Steel

	Per Gross Ton
3 in. to 12 in.	\$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00
Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.	
Prices delivered Detroit are \$2.25 higher.	

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	\$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.30c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton \$54.00

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per Lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57 1/2c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 3c. higher.

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	21.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	21.00c.
Sheets	36.00c.	31.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	21.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston††	\$25.53	\$25.03	\$26.53	\$26.03		
Brooklyn	27.65			28.15		
Jersey City	26.62	26.12	27.62	27.12		
Philadelphia	25.89	25.39	26.89	26.39		
Bethlehem, Pa.	25.00	24.50	26.00	25.50		
Everett, Mass.††	25.00	24.50	26.00	25.50		
Swedeland, Pa.	25.00	24.50	26.00	25.50		
Steelton, Pa.		24.50			\$29.50	
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	
Sparrows Point, Md.	25.00	24.50				
Erie, Pa.	24.00	23.50	25.00	24.50		
Neville Island, Pa.	24.00	23.50	24.50	24.00		
Sharpsville, Pa.*	24.00	23.50	24.50	24.00		
Buffalo	24.00	23.00	25.00	24.50	29.50	
Cincinnati	24.68	24.68		25.18		
Canton, Ohio	25.47	24.97	25.97	25.47		
Mansfield, Ohio	26.06	25.56	26.56	26.06		
St. Louis	24.50	24.00				
Chicago	24.00	23.50	24.50	24.00		\$31.00
Granite City, Ill.	24.00	23.50	24.50	24.00		
Cleveland	24.00	23.50	24.50	24.00		
Hamilton, Ohio	24.00	23.50	24.50	24.00		
Toledo	24.00	23.50	24.50	24.00		
Youngstown*	24.00	23.50	24.50	24.00		
Detroit	24.00	23.50	24.50	24.00		
Lake Superior Fe.					\$28.00	
Lyles, Tenn. Fe.					33.00	
St. Paul	26.76		27.26	26.76		
Duluth	24.50		25.00	24.50		
Birmingham	20.38	19.00	25.00			
Los Angeles	27.25					
San Francisco	27.25					
Seattle	27.25					
Provo, Utah	22.00					
Montreal	27.50	27.50		28.00		
Toronto	25.50	25.50		26.00		

GRAY FORGE IRON: Valley or Pittsburgh furnace \$23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

**Pittsburgh Ferromanganese Co. (Chester furnace only) may charge \$2.25 a ton over maximum basing point prices.

†Price shown is for low-phosphorous iron; high-phosphorous sells for \$28.50 at the furnace.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at \$1 per gross ton above maximum prices.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

NATIONAL EMERGENCY STEELS (Hot Rolled)

Extras for Alloy Content

Designation	CHEMICAL COMPOSITION LIMITS, PER CENT									Basic Open-Hearth		Electric Furnace	
	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Silicon	Nickel	Chromium	Molybdenum	Vanadium	Bars & Bar-Strip	Billets, Blooms, & Slabs	Bars & Bar-Strip	Billets & Blooms & Slabs
NE 8024	.22/.28	1.00/1.30	.040	.040	.20/.35			.10/.20		.45c	\$ 9.00	.95c	\$19.00
NE 8124	.22/.28	1.30/1.60	.040	.040	.20/.35			.25/.35		.85	17.00	1.35	27.00
NE 8233	.30/.36	1.30/1.60	.040	.040	.20/.35			.10/.20		.65	13.00	1.15	23.00
NE 8245	.42/.49	1.30/1.60	.040	.040	.20/.35			.10/.20		.65	13.00	1.15	23.00
NE 8339	.35/.42	1.30/1.60	.040	.040	.20/.35			.20/.30		.75	15.00	1.25	25.00
NE 8442	.38/.45	1.30/1.60	.040	.040	.20/.35			.30/.40		.90	18.00	1.40	28.00
NE 8447	.43/.50	1.30/1.60	.040	.040	.20/.35			.30/.40		.90	18.00	1.40	28.00
NE 8547	.43/.50	1.30/1.60	.040	.040	.20/.35			.40/.60		1.25	25.00	1.75	35.00
NE 8620	.18/.23	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.15/.25		.75	15.00	1.25	25.00
NE 8630	.27/.33	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.15/.25		.75	15.00	1.25	25.00
NE 8724	.22/.28	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30		.80	16.00	1.30	26.00
NE 8739	.35/.42	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30		.80	16.00	1.30	26.00
NE 8744	.40/.47	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30		.80	16.00	1.30	26.00
NE 8749	.45/.52	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30		.80	16.00	1.30	26.00
NE 8817	.15/.20	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.30/.40		.90	18.00	1.40	28.00
NE 8949	.45/.52	1.00/1.30	.040	.040	.20/.35	.40/.60	.40/.60	.30/.40		1.20	24.00	1.70	34.00

Note: The extras shown above are in addition to a base price of 2.70¢ per 100 lb., on finished products and \$54. per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished.

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Today, as never before, the equipment of war as well as the machines of industry need tough stress resistant forged parts — "muscles" to take the punishing abuse of combat and the wrack of three shift operation.

We're making these "muscles" in ever increasing quantities for planes, for ships, for guns, tanks, ordnance and machine tools — drop forgings, upset forgings, hammer forgings — parts from a fraction of an ounce to many tons each in weight — forgings of every shape and size to meet the insistent demands of greater war production.

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Proudly we fly the Army and Navy "E" flag awarded for excellence and proficiency in the production of War materiel

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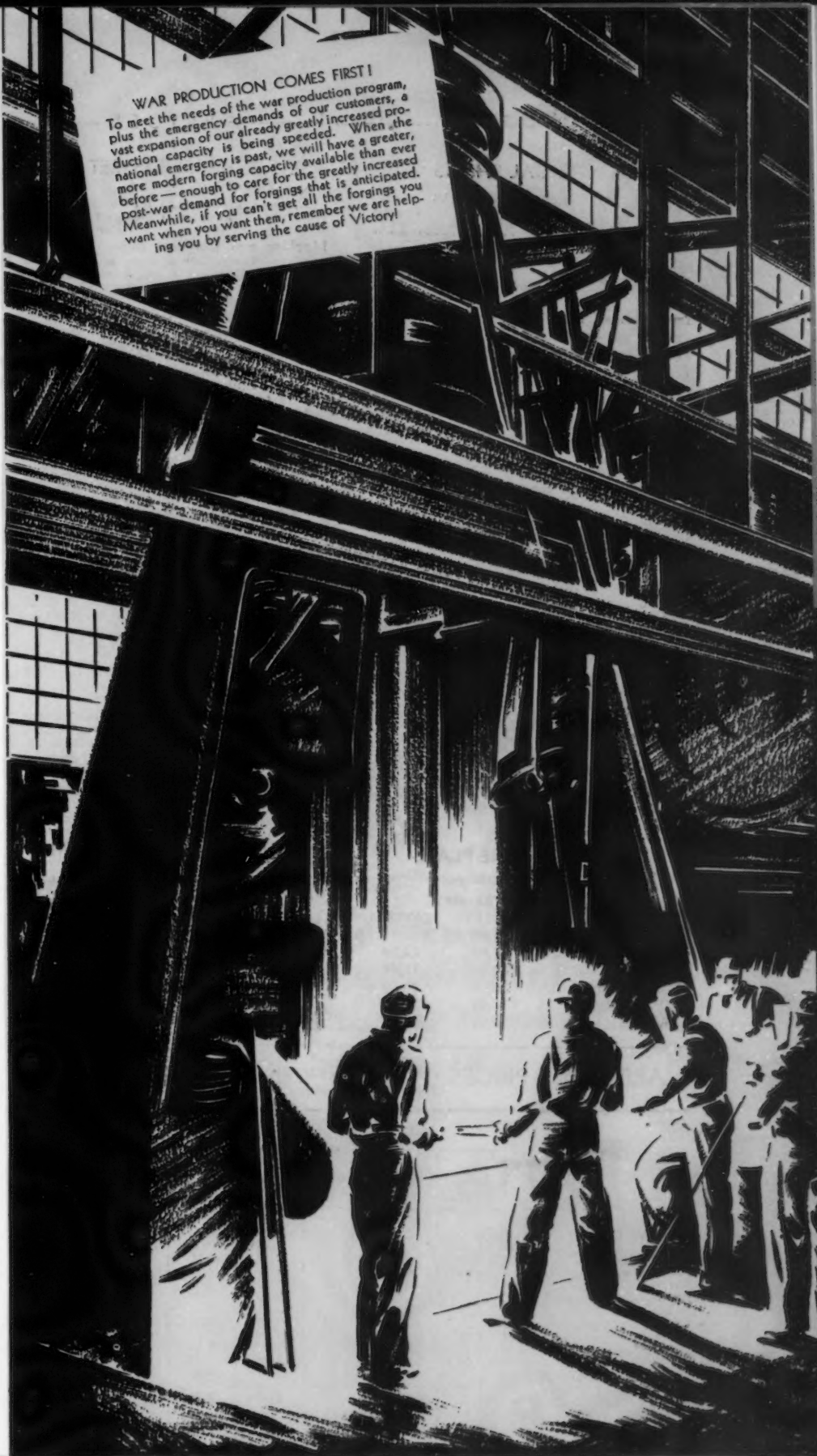
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To meet the needs of the war production program, plus the emergency demands of our customers, a vast expansion of our already greatly increased production capacity is being speeded. When the national emergency is past, we will have a greater, more modern forging capacity available than ever before — enough to care for the greatly increased post-war demand for forgings that is anticipated. Meanwhile, if you can't get all the forgings you want when you want them, remember we are helping you by serving the cause of Victory!



Making airplane parts on a 20,000 pound drop hammer in the Kropp shops

KROPP



PRICES

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham

	Base per Keg
Standard wire nails	\$2.55
Coated nails	2.55
Cutnails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	\$3.05
Annealed galvanized fence wire	3.40
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and Carriage Bolts:	
½ in. & smaller x 6 in. & shorter	65½
9/16 & ¾ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1½ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Flow bolts	65

Nuts, Cold Punched or Hot Pressed:

(Hexagon or Square)	
½ in. and smaller	62
9/16 to 1 in. inclusive	59
1½ to 1½ in. inclusive	57
1½ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	71	64
½ in. and smaller	62	
½ in. through 1 in.	60	
9/16 to 1 in.	59	
1½ in. through 1½ in.	57	58
1½ in. and larger	56	

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	
71 and 10	
Stove bolts in packages, with nuts attached	71
Stove bolts in bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets (½ in. and larger)	Base per 100 lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$3.75

Small Rivets (7/16 in. and smaller)	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws	Per Cent Off List
Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills (F.o.b. Pittsburgh only on wrought pipe) Base Price—\$200 per Net Ton

Steel (Butt Weld)	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	24	3½
¾ in.	30	10
1 and 1½ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

½ in.	Black	Galv.
¾ in.	61½	50½
1 to 3 in.	65½	54½
	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as Above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld.

WAREHOUSE PRICES (Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 49)

CITIES	SHEETS			STRIP		Plates (¼ in. and heavier)	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 ga.)	Cold Rolled	Galv. (24 ga.)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled 2300	Hot Rolled 3100	Cold Drawn 2300	Cold Drawn 3100
Pittsburgh	\$3.35		\$4.65	\$3.60	\$3.20	\$3.40	\$3.40	\$3.35	\$3.65	\$7.45	\$5.75	\$8.40	\$6.75
Chicago	3.25	4.10	4.85¹	3.60	3.50	3.55	3.55	3.50	3.75	7.35	5.65	8.40	6.75
Cleveland	3.35	4.05	4.62	3.50	3.20	3.40	3.58	3.25	3.75	7.55	5.85	8.40	6.75
Philadelphia	3.65	4.05²	4.65	3.51	3.31	3.55	3.55	3.85	4.06	7.31	5.86	8.56	7.18
New York	3.58	4.60²	5.00	3.96³	3.51	3.76	3.75	3.84	4.09	7.60	5.90	8.84	7.19
Detroit	3.43	4.30	4.84¹	3.68⁴	3.40	3.60	3.65	3.43	3.80	7.67	5.97	8.70	7.05
Buffalo	3.25	4.30¹	4.75⁴	3.82	3.52	3.62	3.40	3.35	3.75	7.35	5.65	8.40	6.75
Boston	3.71	4.68	5.11	4.06	3.46	3.85	3.85	3.98	4.13	7.75	6.05	8.88	7.23
Birmingham	3.45³		4.75¹	3.70³		3.55³	3.55³	3.50³	4.48				
St. Louis	3.39	4.24²	4.99¹	3.74	3.61	3.69	3.69	3.64	4.02	7.72	6.02	8.77	7.12
St. Paul	3.50	4.35	5.00	3.85	3.83	3.80	3.80	3.75	4.34	7.45	6.00	8.84	7.44
Milwaukee	3.38	4.23²	4.98¹	3.73	3.54	3.68	3.68	3.85	3.88	7.58	5.88	8.63	6.98
Baltimore	3.50		5.05	4.00		3.70	3.70	3.85	4.04				
Cincinnati	3.42	4.37²	4.42¹	3.67	3.45	3.65	3.68	3.60	4.00	7.69	5.99	8.50	7.10
Norfolk	3.85		5.40	4.10		4.05	4.05	4.00	4.15				
Washington	3.60			4.10		3.80	3.80	3.95	4.10				
Indianapolis	3.45	4.25	5.01¹	3.75	3.28	3.70	3.70	3.60	3.97	7.67	5.97	8.72	7.07
Omaha	3.85		5.52¹	4.20		4.15	4.15	4.10	4.42				
Memphis	3.85		5.25	4.10		3.95	3.95	3.90	4.31				
New Orleans	4.05			4.30		3.90	3.90	4.10	4.60				
Houston	4.00			4.30		4.05	4.05	3.75					
Los Angeles †	4.95	7.15	5.95	4.90		4.90	4.60	4.35	6.60	9.55	8.55	10.55	9.55
San Francisco †	4.55	7.05	6.10	4.50		4.65	4.35	3.95	6.80	9.60	8.60	10.60	9.60
Seattle †	4.65†		5.70†	4.25		4.75	4.45	4.20	5.75		8.00		

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: ¹500 to 1499 lb. ²400 to 1499 lb. ³400 to 1999 lb. ⁴450 to 1499 lb. ⁵1000 to 1999 lb. ⁶300 to 10,000 lb. At Philadelphia galvanized sheets, 25 or more bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb., galvanized and cold rolled sheets, 750 to 4999 lb., cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over, hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb., galvanized sheets, 150 and over; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier. †\$3.43. †Los Angeles, San Francisco and Seattle prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.